the OIL AND GAS JOURNAL

DECEMBER 1, 1958

EXPLORATION p. 165

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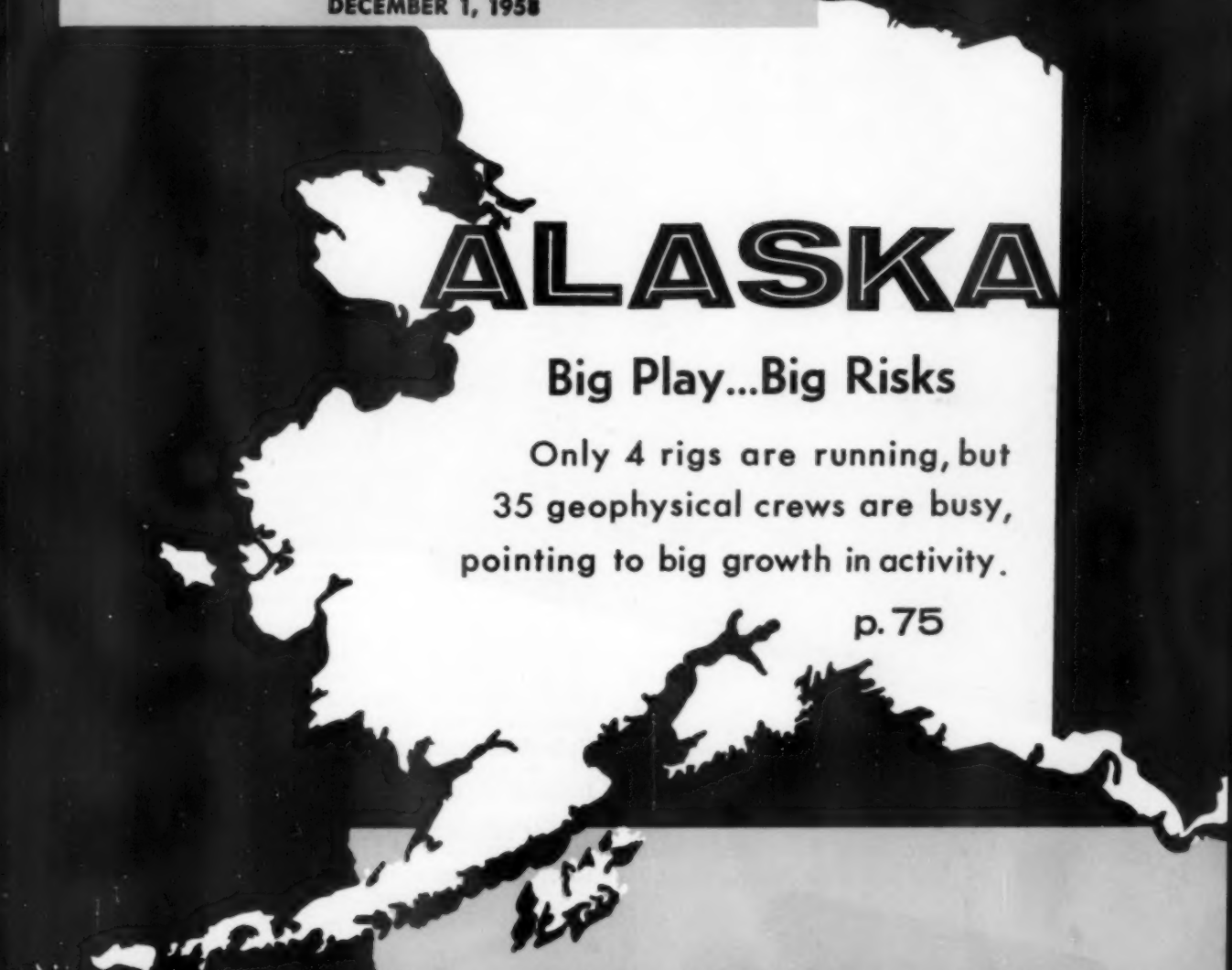
STATISTICS p. 196



ALASKA

Big Play...Big Risks

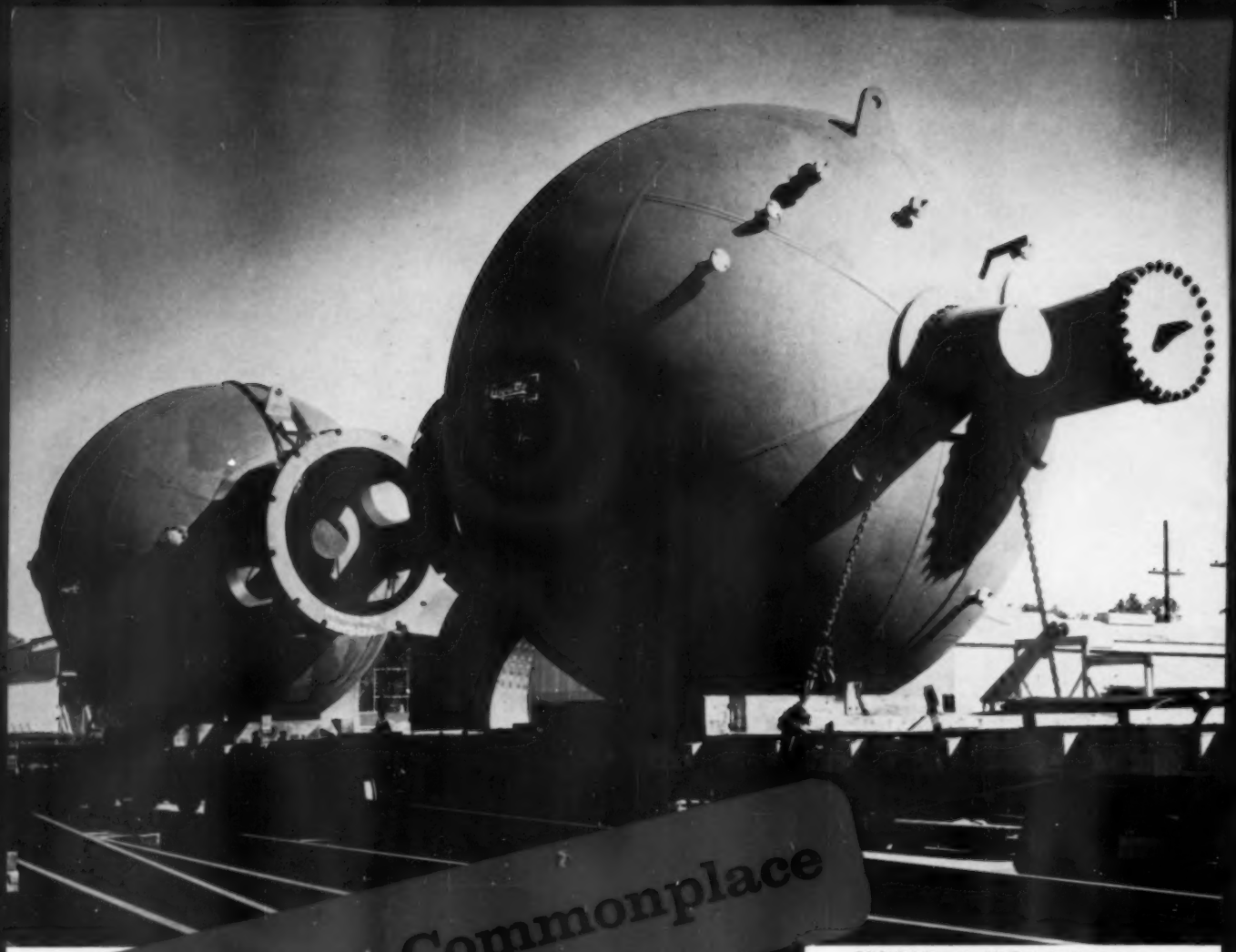
Only 4 rigs are running, but 35 geophysical crews are busy, pointing to big growth in activity.

p. 75

New Techniques Find Oil Seeps Offshore p. 82

36-In. Pipe Laid at Record Speed p. 98

Tips on Maintaining Fired Heaters p. 103



Fabricated from special 1¾-inch plate, each reactor is 17 feet, 6 inches in diameter and weighs in excess of 100,000 pounds.

Spherical reactors, essential in the changing pattern of catalytic processing, leave Wyatt's Houston plant for duty in oil refining.

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the OIL AND GAS JOURNAL Newsletter

Tulsa, Okla.
Dec. 1, 1958

Operations in Alaska will pick up fast in 1959:

But oil men already on the scene or studying the prospects say two things:

...Another big strike in an interior basin would touch off a leasing boom that would gobble up every open lease in the new state.

...The oil outlook for Alaska is still very long-range.

Here's the current situation there:

...Leases already cover 40 million acres.

...Three wells active, all with fishing trouble. But several rigs are on the way up from the West Coast, and six may be drilling by early next year.

...At least 35 geological and geophysical crews were busy during last season. Three more geophysical companies are sending in instruments and will assemble crews.

...Center of interest at first will be the Kenai, areas bordering Gulf of Alaska and Cook inlet, the Bethel and Copper River basin (p. 75).

▼ ▼ ▼

Threat of an oil-industry srike is being emphasized more and more by OCAW leadership. President O. A. Knight, after the Sinclair wage rebuff, says:

"Our members are not anxious to strike, but they need and deserve a raise. They will strike to get it."

Locals over the country are taking strike votes. At least 10 Gulf Coast refineries have granted their leaders authority to strike if necessary. Knight says a strike vote among Sinclair employes carried by big margin.

So far, however, no walkouts have been authorized by OCAW chiefs in Denver.

▼ ▼ ▼

Cold weather is putting zip into heating oils.

Prices have moved up and stabilized at higher levels on both East and Gulf coasts.

Socony Mobil led price parade in east with a 0.5-cent higher posting, putting price for No. 2 fuel at 10.20 cents a gallon on the barge market in New York harbor. Other suppliers followed.

Adjustments on the Gulf Coast amounted to 0.25 cent a gallon higher.

Even with increases, distillate is selling below quotations for last two winters and well below the 11-cent price of 10 years ago.

▼ ▼ ▼

The federal Government will become increasingly involved in the fight against air pollution.

Present legislation will be renewed and expanded. That's the word from Arthur S. Flemming, secretary of U. S. Department of Health, Education, and Welfare.

Federal program is now limited mostly to research and technical assistance. But the Government is being urged to take a hand in control measures whenever the problem extends beyond state boundaries.

Here's a new idea of how expensive pollution control is.

The chemical industry alone spends $250 million annually to control or avoid air pollution.

Lowest estimate of pollution-control cost for individual companies ran from 1 to 1½% of all production costs. This doesn't include cost of research into pollution.

▼ ▼ ▼

Don't count too heavily on future Mexican gas supplies.

Feeling in Mexico is that there will be no further exports beyond the 200,000 M.c.f. daily already covered in a contract with Texas Eastern.

Pemex plans as a national policy to emphasize natural gas as a fuel in Mexican industrial development. The reason: Its delivered price is only half the cost of its equivalent in fuel oil.

A proposal to take Mexican gas to California was rejected recently because of this policy.

An unusually busy winter pipeline construction season is in prospect.

Several big jobs were late in starting because of FPC delays. They are running over into late fall. Several others are still to be let.

A lot of equipment is working that normally would be idle from fall almost until spring.

Chance to suggest changes in Natural Gas Act will be given natural-gas producers and pipeline companies.

The FPC has invited interested parties to participate in clarifying the FPC's authority to issue temporary certificates. Comments and suggestions are to be submitted by December 5.

House probers have been critical of agency's policy in

granting temporary certificates for permanent pipeline facilities (OGJ, Nov. 24, p. 41).

The House committee indicates it will propose an amendment to the gas act to fix terms under which the temporary certificates may be issued. The FPC was invited to help.

▼ ▼ ▼

Venezuela's professional politicians are dismayed at the strength being shown by Rear Admiral Wolfgang Larazabal. He is the strongest contender in the current race for president.

A Caracas rally for Larazabal turned into a cheering throng of more than 100,000. It was a downright shock even to his strongest backers.

Then the navy man went to the provinces for his grass-roots campaign where 80% of the country's voting strength lies. Again his reception amazed his own backers and chilled opposing politicians.

The big question: Does the noisy and efficient Communist party support of Larazabal mean anything more than just electioneering politics?

▼ ▼ ▼

The oil industry should not identify itself with either political party, says Wyoming's new U. S. Senator, Gale McGee, a Democrat.

He told the Wyoming Geological Association the industry is a victim of its own bad public relations.

His analysis: Too many people think too much easy money is being spent to influence public opinion. A strong backing by the consuming public can't be bought. It can only be earned.

▼ ▼ ▼

California offshore drilling will shift into high in '59.

At least five new structures are planned for the year, principally in the Santa Barbara region. Since drilling must be done at least a mile from shore, water depths there preclude the use of earth-filled islands.

Next drilling platform probably will be built for Standard of California and Humble on their 3,840-acre Gaviota parcel. Bids for the structure have been asked from at least three California firms.

Design of the new structure reportedly calls for a drilling pattern of two rows of 12 wells each. This is a change from the 5-well-5-row pattern used at Summerland platform. Main reason for the switch is greater ease with which wells can be segregated in case of fire.

Drilling spots to watch:

...Illinois basin is in for a pickup. Sudden spurt will stem from two big wells in Saline and Gallatin counties.

One flowed 1,488 bbl. daily, the other 960 bbl. daily.

...Las Animas arch in eastern Colorado will be explored by Phillips and Creslenn following successful wildcatting in northwestern Kansas.

...Wind River basin's north side is helped by two oil strikes by California Co. Big news in the discovery was appearance of Tertiary oil at shallow depths.

...San Juan basin's Horseshoe Canyon area is linked with Verde field by new discovery. Eleven new locations have been made on basis of this news in busy New Mexico region.

...Paradox basin's Tohonadla field is growing. Three new producers have come in, all on a northeast line from the field discovery. Field now has 7 wells.

A way to detect and track down hydrocarbon seeps in submerged areas has been perfected by Atlantic Refining Co. researchers.

Key element in the seep bloodhound is an infrared analyzer unit which checks for methane in the water.

It's viewed as a cheap way to take a first look at oil and gas possibilities in virgin exploratory areas.

▼ ▼ ▼

1959 has an optimistic tone for butadiene producers.

They hear rubber consumption is expected to reach 1,500,000 tons.

That's 13% higher than 1958 and very close to the all-time high set in 1955.

Cost-conscious refiners should check Esso Petroleum Ltd.'s experience with air-fin coolers.

This Jersey Standard affiliate expects to save $2 million through use of air-fin coolers in its 100,000-bbl. Milford Haven refinery now under construction in Wales. Another $1.2 million will be saved at the Whitegate refinery now being built in Ireland by Esso Petroleum and others.

Savings are realized through reduction or elimination of cooling water and sewer systems. Companion savings also can be gained by eliminating problems associated with water pollution.

Industry interest in air coolers can be gaged by upcoming AIChE meeting in Cincinnati when seven papers will be devoted to the subject.

Claim is now discredited that propylene in propane is cause of knocking, burned valves, and other poor operations in engines using LPG as fuel.

This was uncovered by LPG committee of the Natural Gasoline Association of America in a series of full-scale engine tests.

Several widely used engines were tested. Fuels ranged from pure propane to 40% blends of propylene and propane.

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Good Wells Make Good News

A Monthly Report of Successful Well Treatments

December 1, 1958

Of all the fracturing services offered by Dowell, there are several reasons why Sandfrac® is one of the most popular. Net cost is low because the lease crude or refined oil used as the fracturing fluid can usually be sold with well production. Reliability is high because emulsion, water block and silicate swelling problems are kept to a minimum. Most important, results have been generally excellent and payouts have been fast. Here are four recent jobs that illustrate types of wells especially suited to Sandfrac.

- **Ochiltree County, Texas Panhandle.** (New Oil Well) This well was completed in the upper Morrow sand of the Farnsworth pool through perforations from 7930 to 7940 feet. Dowell recommended Sandfrac using lease crude on the basis of tests run on formation samples and on the field crude. The treatment was designed to give the operator good results with freedom from emulsions and clean-up troubles. 95 barrels of lease oil carrying 6000 pounds sand were pumped down casing and into the pay at 19 bpm. *After clean-up, well produced 39 bopb on Railroad Commission Test.*

- **San Juan County, New Mexico.** (New Gas Well) This well was completed through perforations from 6236 to 6248 feet into the Gallup sand. Initial production was a non-commercial 5 mcfd. Operator ordered Sandfrac. Dowell injected 19,000 gallons lease oil with 19,000 pounds sand and 45 perforation ball sealers. Average injection rate was 47.6 bpm with a maximum treating pressure of 3600 psi. *After treatment, well tested 43,193 mcfd.*

- **Loving County, Texas.** (Old Oil Well) This well was originally completed with nitro shots in the Delaware sand at 4335 feet. Production had declined to 8 bopd, so the operator ordered Sandfrac. 10,000 gallons lease crude carrying 15,000 pounds sand was injected at 30 bpm and 1300 psi. Total cost for Dowell service to operator was only $1670. *After clean-up, well tested 350 bopd.*

- **Garvin County, Oklahoma.** (New Oil Well) This well was completed in the Bromide sand of the East Antioch pool. Perforations were from 5602 to 5678 feet. Since well would not produce without stimulation, operator ordered Sandfrac. Dowell injected 10,000 gallons refined oil with 10,000 pounds sand and 100 pounds of temporary plugging agent. Injection was down 2½-inch tubing at 5200 psi and 8 bpm. 10 gallons Freflo® was used to aid in clean-up. *After treatment, well flowed 240 bopd on test.*

For more detailed information or prompt service, call any of the 165 Dowell offices and service points. In Canada, call Dowell of Canada, Ltd.; in Venezuela, contact United Oilwell Service. Or write Dowell, Tulsa 1, Oklahoma.

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NEW YORK OFFICE
500 Fifth Avenue
Phone LOngacre 4-6160
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HOUSTON OFFICE
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1238 Mercantile Bldg.
Phone Riverside 8-3074
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LOS ANGELES OFFICE
650 South Grand Avenue
Phone MAdison 2-0722
D. H. Stormont ..... West Coast Editor
William T. Smith ..... District Editor

WASHINGTON OFFICE
621 Albee Building
Phone DIstrict 7-1710
Joe Reilly ..... Washington Editor

Correspondents at Denver, Pittsburgh, Calgary, Columbus, Ashland, Ky., Oil City, Pa., Mount Pleasant, Mich., Melbourne, Australia; Regina, Sask.; Chatham, Ont.; Casper, Wyo., and Anchorage, Alaska.

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TECHNOLOGY—OPERATION

Pipelining

Laying 36-In. Pipe at Record Speed **98**

By Gene Kinney

Three experienced contractors are proving that given enough manpower and heavy equipment you can lay 36-in. pipe about as fast as 30-in. Work is proceeding on the Fritch, Tex.-Chicago system of Natural Gas Pipeline Co. of America.

Package LACT Unit Is Mobile, Dependable, and Accurate **145**

By M. H. Jackson and Gene Kinney

The unit measured several hundred thousand barrels of oil over a period of several months as a demonstration unit. Recently it was trucked from the Tulsa plant of the builder as a complete unit to a lease in West Texas. It was then installed within a few days.

Refining-Processing

How to Inspect and Maintain Fired Heaters **103**

By Peter von Wiesenthal

Inspection of these units must be designed primarily to assure safe operation at all times. This requires the implementation of a program consisting of four basic steps: (1) Regular inspection during operation; (2) elimination of potentially dangerous operating conditions; (3) a regularly scheduled shutdown and detailed mechanical inspection; and (4) repair or replacement of all components that do not meet rigid minimum standards.

Process Costimating **115**

The cost of jet and process steam is by far the largest single cost in the operations of most petroleum vacuum distillation plants.

The Foreman's Page **118**

Pick the right construction materials and prevent expensive refinery shutdown.

New Asphalt Plant Processes Segregated Feed Stocks **126**

By Larry Resen

This Cities Service plant near Linden, N. J., processes Boscan and Lagunillas crudes from Venezuela, Panuco crude from Mexico, and tar bottoms shipped in from other plants. These four feed stocks are segregated in storage and then processed independently.

Refinery Construction Index **130**

Drilling-Production

Blowout-Prevention Instruction is a Must .. **120**

By E. C. Prehoda, Jr.

A preplanned program will insure that drilling work and blowout-prevention operations can proceed safely and quickly. The preplanned blowout program should include: (1) A familiarization of the type of blowout-preventer hookup; (2) visual inspection of the procedures before installation; (3) supervised procedure in getting the preventer into position; and (4) close supervision of bolting, installation of control wheels, and testing the hookup.

New Handbook of Gas-Well-Potential Testing **123**

This new IOCC manual will standardize recommended procedures; it should be published by next summer.

Phillips Operates Unmanned Offshore Platform by Remote Control **135**

By R. W. Elliott

From a central platform the switcher can take care of operations on other platforms: Open, close, or change the production rate of a well; read tubing and header pressures; control chemical pumps, fog horns, and lights; put any well on test; phone the tank battery and well platforms; and communicate with boats and onshore office by radio.

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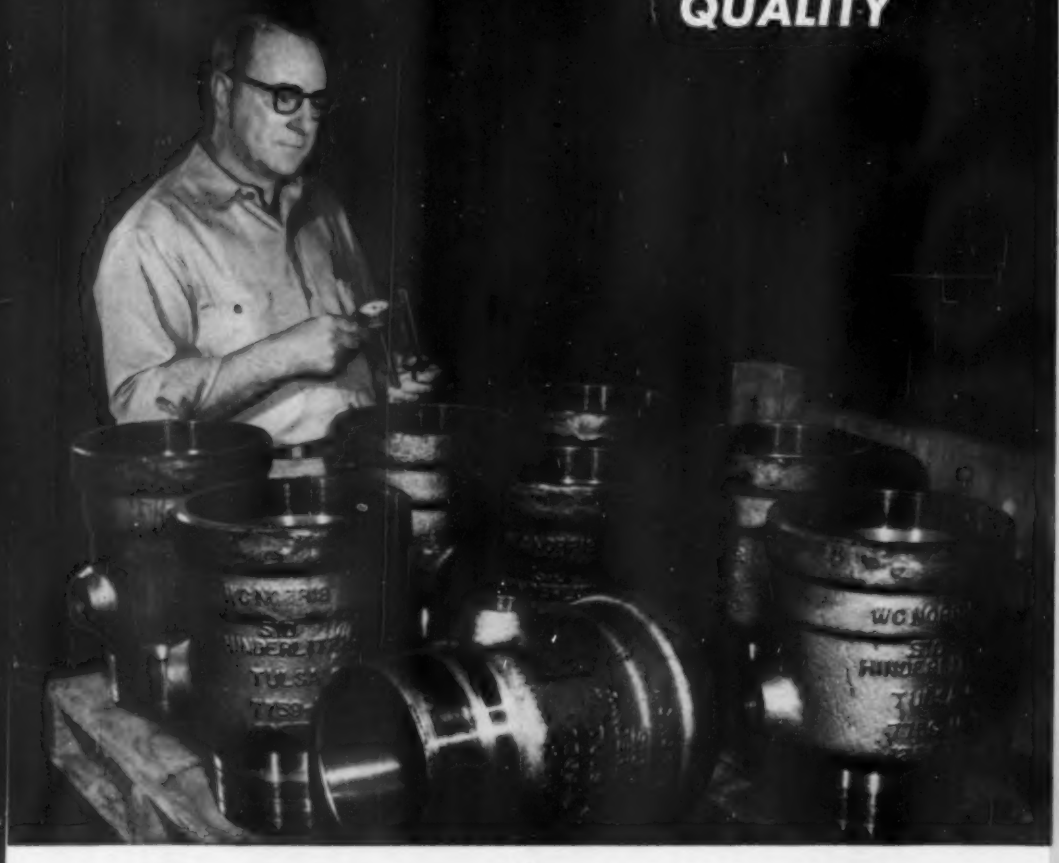
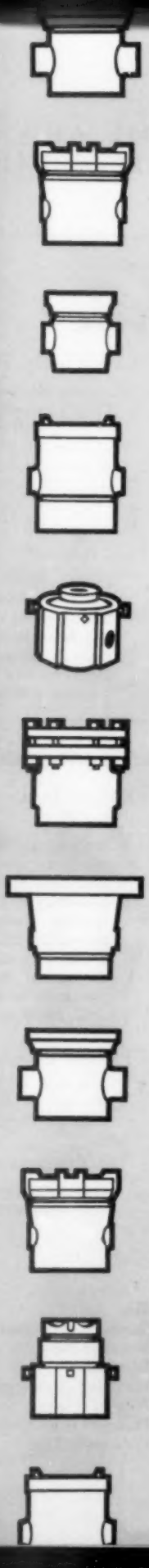
INSPECTION — Key to Norris-Hinderliter Well Head QUALITY





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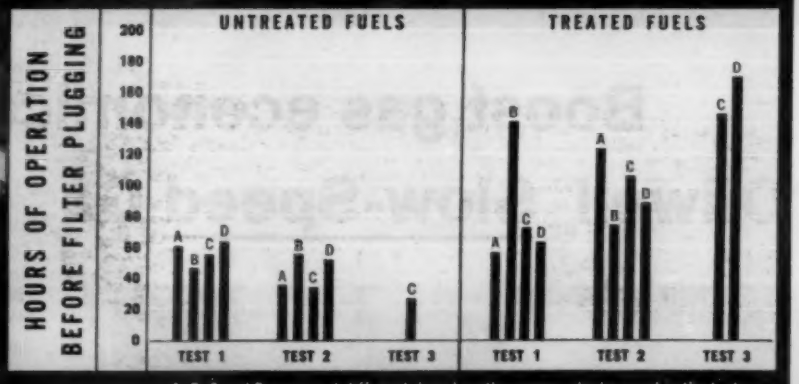

A, B, C and D represent different diesel earth-moving vehicles used in the tests

Additives double the life of diesel fuel filters in earth-moving equipment, cut downtime in half

Five recent months of field and laboratory tests put new light on filter performance in automotive diesel equipment.

The first field testing phase determined the "hours to plugging" of secondary filters in earth-movers operating on fuel which had *not* been treated with Du Pont additives. These were the commonly used resin-impregnated paper filters with a porosity of approximately two microns . . . filters known to afford excellent protection for the fuel-injection units.

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This means, of course, that only half as many filters were required, and that costly downtime for emergency servicing in the field, and filter replacement, was cut in half.

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By using FOA-2, you can balance stocks to meet varying market demands, because it stabilizes fuel during storage. You can stabilize cat-cracked distillates or blends with straight-run stocks. And, you can improve residuals, too.

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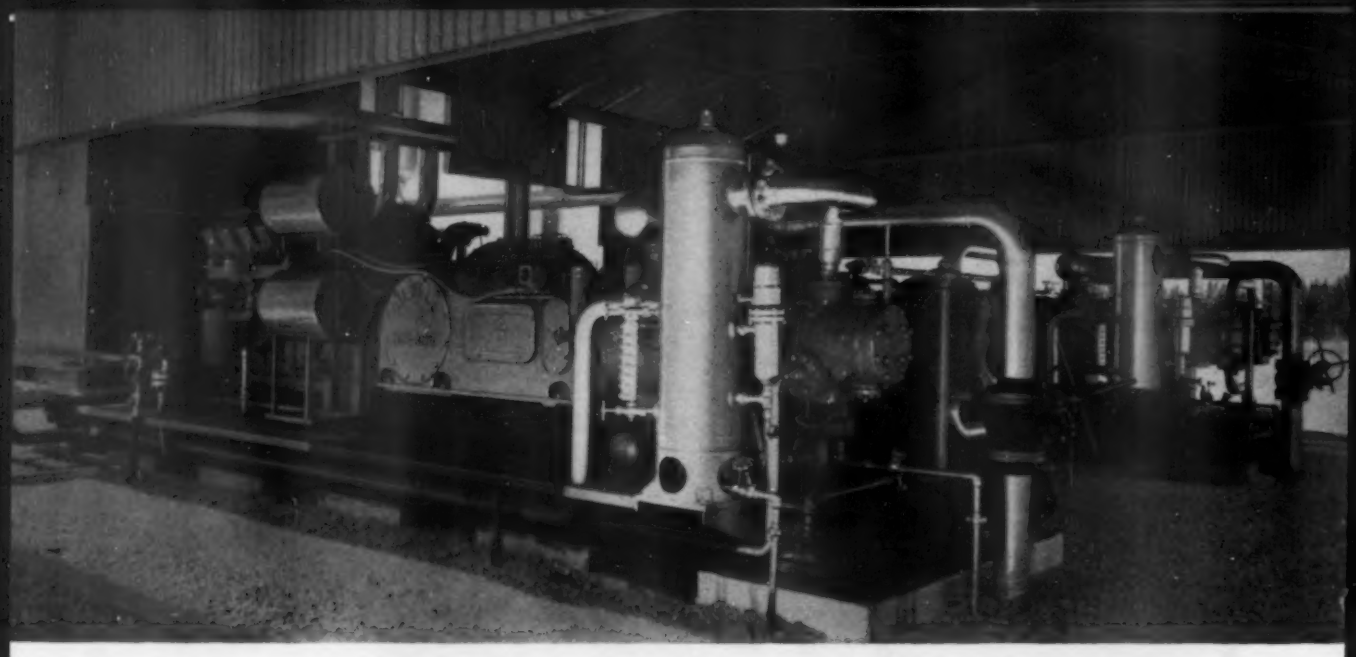
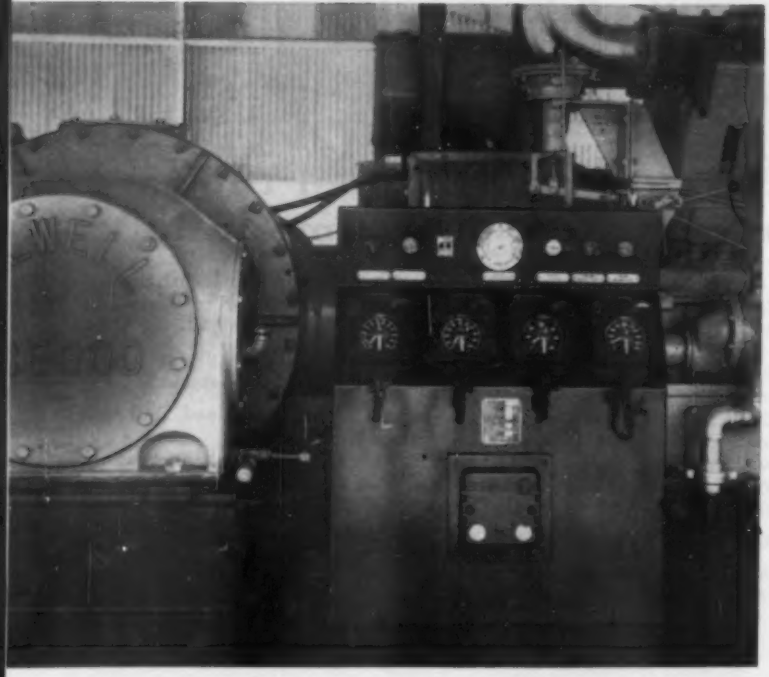


Boost gas economically with "Oilwell" Slow-Speed Gas Compressors



All gauges and safety controls are grouped and mounted on a shock-resistant panel for operating convenience.

Near Lake Charles, Louisiana, these "Oilwell" DGE-300 Gas Compressors are being used in an interesting combination gas-lift, gas-sales application. The gas is boosted through three stages—from 10 psig inlet pressure to 1,050 psig discharge pressure—and air-cooled after each stage through tube-and-fin vertical radiators. Each unit operates at 277 rpm and can handle approximately 1,125,000 standard cubic feet of gas per 24 hours.

The units consist of tandem compressors mounted side by side and driven by a single gas engine through a fully enclosed, right-angle, spiral-bevel gear transmission. Together with cooler, scrubber, and automatic controls, everything is mounted on a single heavy-duty skid base with integral piping.

"Oilwell" Gas Compressors range from 25 to 300 hp and can be furnished to perform a wide range of gas-handling functions. Contact your "Oilwell" representative for information about the money-saving advantages of an "Oilwell" slow-speed compressor for your gas-moving operations.

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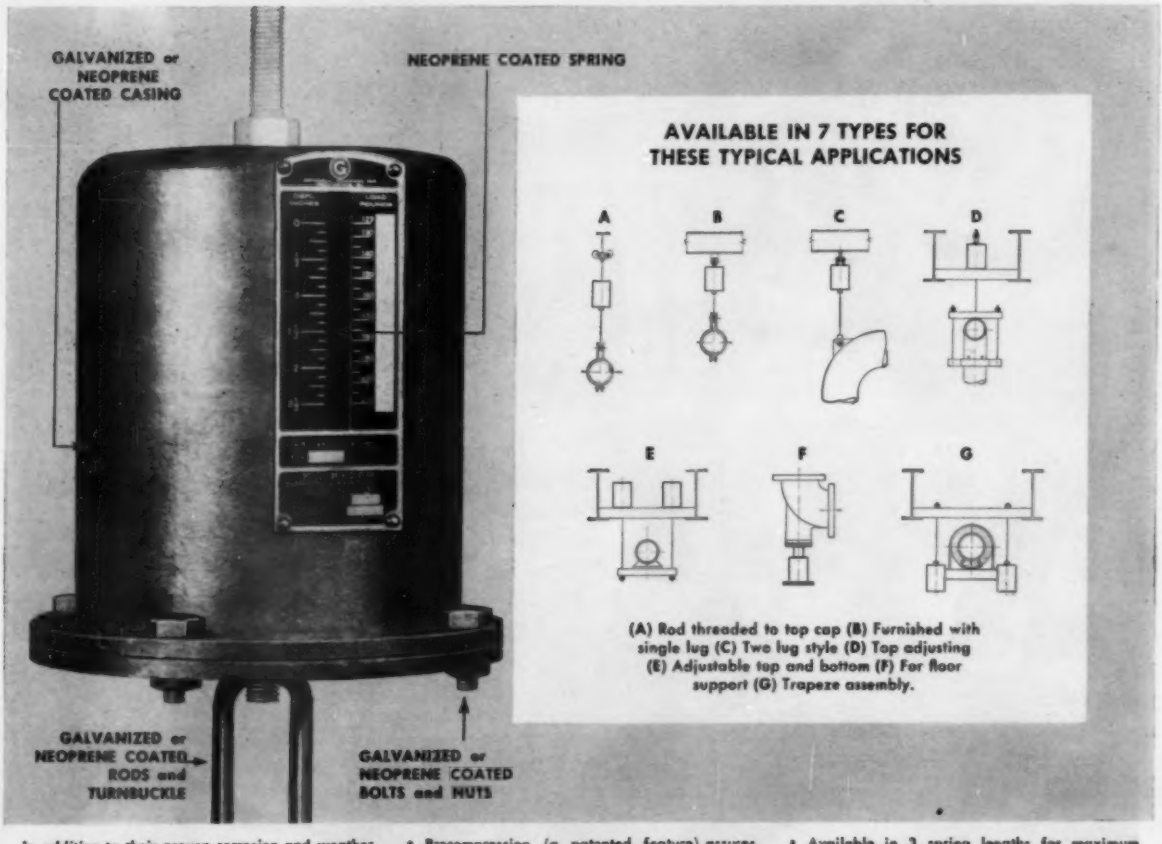
GRINNELL VARIABLE SPRING HANGERS


GALVANIZED or NEOPRENE COATED CASING
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C
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(A) Rod threaded to top cap (B) Furnished with single lug (C) Two lug style (D) Top adjusting (E) Adjustable top and bottom (F) For floor support (G) Trapeze assembly.

In addition to their proven corrosion and weather resistance, these spring hangers offer other features.

- Maximum variation in supporting force for standard spring models per ½" of deflection is 10½% of rated capacity — in all sizes.
- Precompression (a patented feature) assures operation of spring within its proper working range, as well as saving valuable erection time. Reduced over-all height saves space.
- 21 sizes available from stock for load ranges from 50 lbs. to 28,200 lbs.
- Available in 3 spring lengths for maximum travel of 1¼, 2½, and 5 inches.
- Installation simplified by integral load scale and travel indicators.
- All-steel welded construction meets pressure piping code.

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These hangers are the result of extensive experimentation with various coatings for Grinnell's standard pre-engineered spring hangers. In addition to providing flexibility in pipe suspension, they provide versatility of application through their corrosion-resistant characteristics.

1. NEOPRENE COATED – for highly corrosive conditions, such as those found in chemical plants and refineries. All parts of the hanger are neoprene coated to protect the base metal from a wide range of corrosives. The flex life of the spring is unaffected by the neoprene . . . the coating resists cracking or flaking over a wide temperature range.

2. GALVANIZED – for outdoor installations, where weather conditions are severe. All parts of the hanger are galvanized except the spring, which is neoprene coated to avoid alterations of temper, hydrogen embrittlement and decreased flex-life of the spring – usual hazards to springs from the galvanizing process. Write for further details.

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AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPORTS

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pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

All the comforts of home

A little bit of home flies with you when you take a trip on one of today's modern airliners. The friendly comforts . . . the small but important needs . . . are graciously and thoughtfully provided. No wonder so many people are flying.

Last year, America's airliners carried more than 42,000,000 passengers a total of 25 *billion* miles. Providing the fuels and lubricants to make this possible has been a big job for the petroleum industry. Texaco is proud of its part in this task—for during the last 23 years more scheduled revenue airline miles in the United States have been flown with Texaco Aircraft Engine Oil than with all other brands combined.

TEXACO

PROGRESS AT YOUR SERVICE

THE TEXAS COMPANY

PHOTOGRAPHED UNDERWATER AT FLORIDA'S SILVER SPRINGS

Underwater is home for this motor!

New Louis Allis Immersible motor is built to operate in water, sewage, or liquid chemicals

The Immersible motor can be adapted to operate in any kind of liquid — fresh or salt water, sewage, chemicals, or abrasive industrial cutting oils. It's the ideal means to provide power in a vat or sump — at the bottom of a pool, lake, or ocean!

No matter how deep your setting, the Immersible motor provides close-coupled power — saves you the need for expensive jack-shafting, intermediate bearing supports between pump and a surface-mounted motor, and mounting structures.

The motor is oil-filled and sealed at the factory. Diaphragm breathers equalize internal and external pressure — eliminate pressure at the shaft seal and prevent leakage. All joints are sealed to keep water and dirt out. Vinyl-coated housing and stainless or suitably plated exposed parts resist corrosion. Mating surfaces of the housing and flange are precisely machined to provide accurate alignment of the pump impeller and casing.

The Immersible, as shipped, is ready for horizontal or vertical mounting on pumps, agitators, mixers, or special equipment. Sizes range from ¾ to 40 hp. For additional information contact your local Louis Allis District Office, or write for Bulletin 2300, The Louis Allis Co., 449 E. Stewart Street, Milwaukee 1, Wisconsin. But do it today!

SM-109

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

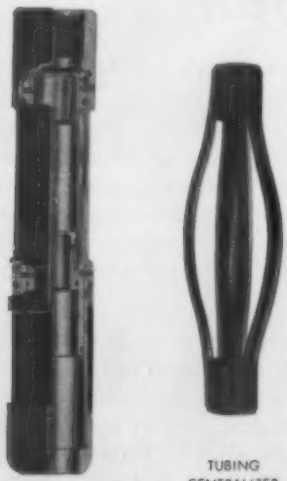
PATTERNED for PRODUCTION...

HALLIBURTON TOOLS AND MATERIALS

Call Halliburton Cementing Services to help establish the beginning and existing life of your well, through the use of "patterned" tools and materials specifically designed and developed for your well requirements.

For more than 34 years Halliburton has set the standard for primary and remedial cementing operations. Flanked by a staff of Research Technicians and a skilled corps of cementing specialists ... long experienced in field problems and operations ... Halliburton has successfully brought forth the most scientifically developed precision tools and highest quality materials in the industry ... helping to aid the production life of your well.

Choose the best equipment money can buy – Choose Halliburton – call our nearest field representative.



FULL-FLOW PACKER SHOE

TUBING CENTRALIZER

HERE ARE SOME HALLIBURTON TOOLS and MATERIALS ...

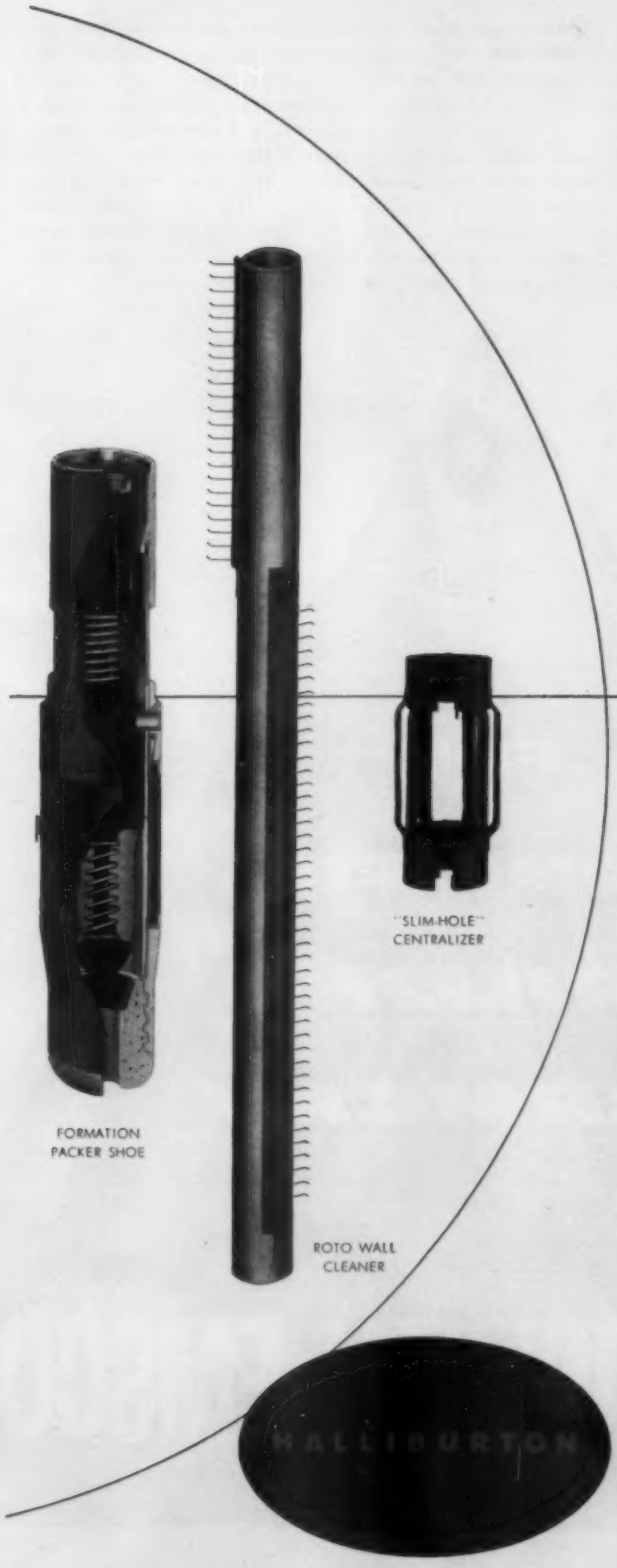
that can help get the most out of your well

FULL-FLOW PACKER SHOE

A packer type cementing shoe especially designed to help protect weak formations while cementing tubing or casing in new or old cased or uncased oil, gas or water injection wells. Particularly useful in old wells before fracturing or treating as an aid to improving production where there is no casing in the hole ... tubing or casing is first cemented, well fractured or treated later. No internal parts remain in the tubing or casing to be drilled out ... reducing drilling fluid damage to formation and costly "drill-out" time.

TUBING CENTRALIZER

Placed on tubing strings in deep wells for protection against wear on tubing and collars when the string is frequently pulled and then re-run; also when tubing is used as a production string or in water injection wells, these tailored centralizers help to center tubing in bore hole and allow better placement of cement around the tubing string.



HALLIBURTON "SLIM-HOLE" CENTRALIZER

Patterned for specific slim hole sizes drilled or for liners run inside casing... made of high strength spring steel, tailored and preformed... most desirable where clearance between string being cemented and the slim hole or casing might allow cement to channel.

HALLIBURTON FORMATION PACKER SHOE

Installed on the first joint of casing string, this Packer Shoe protects low pressure formations below from cement contamination... floats in and guides casing to bottom ... equipped with Super Seal Back Pressure Valve to keep slurry from backing-up inside casing. Circulation may be made through shoe until packer rubber is expanded and set. Special Plug and Baffle Set may be used when bottom cementing plug is desired or cement is to be left in casing one or more joints above packer shoe.

HALLIBURTON ROTO WALL CLEANER

Removes mud cake from walls of a drilled hole by rotating casing before cementing the surface, intermediate or production strings to minimize precautionary or remedial squeeze jobs... permits a free-flow of fluid while running casing, circulating and cementing... eliminates disturbance of mud cake when running casing reducing lost circulation problems... decreases the hazard of "sticking casing" off bottom... distributes cement around casing more evenly by rotating action of the spikes. These are a few advantages of using Halliburton Roto Wall Cleaners... prove them yourself on your next casing cementing job.

HALLIBURTON POZMIX-CEMENT

Thousands of jobs in many varied applications attest to the value of this high-performance cement that is superior to portland cements. Resistant to sulfate and salt water corrosion... lower in cost – easier to pump – easier to perforate – less permeable and more durable. Provides precision control and excellent results in widest range of cementing problems.

HALLIBURTON

CEMENTING SERVICES

HALLIBURTON OIL WELL CEMENTING COMPANY • DUNCAN, OKLAHOMA

"LOOK TO HALLIBURTON FOR LEADERSHIP"

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*Office only. No stock at these points.

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COMPLETE

DRILLING

HARMONY

GO CONTINENTAL-EMSCO

WORLDWIDE

SPECIAL

. . for oil field use

GREEN TRIANGLE V-BELTS

Why gamble on "general purpose" V-belts when GREEN TRIANGLE V-belts . . . designed exclusively to meet rugged oil country use . . . are available from your Continental-Emsco stores?

Here are belts in matched sets, engineered for continuous operation . . . belts that will withstand the heat and abrasive sands of Saudi Arabia, the salt sprays of the Gulf and the deep freeze of Canada.

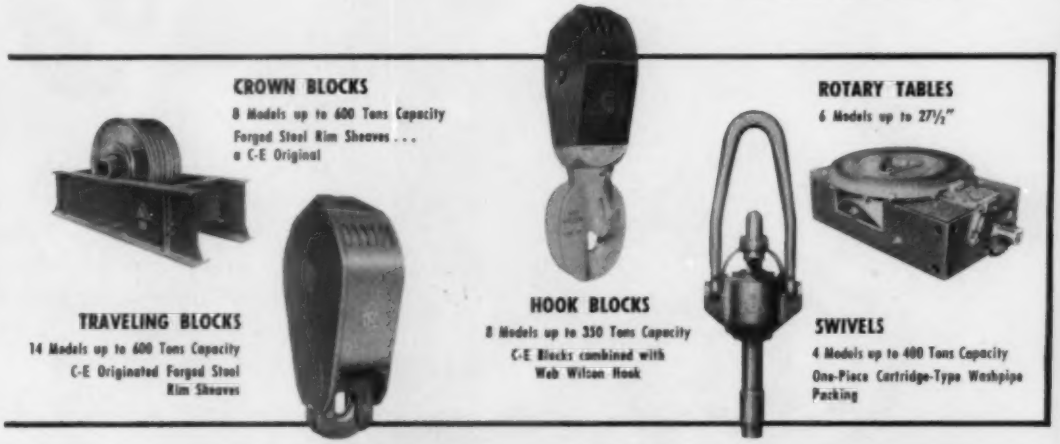
Increase V-belt life with a call to your Continental-Emsco man and ask for *oil field tough* GREEN TRIANGLE V-belts . . . manufactured by the New York Belting and Packing Company and distributed throughout the world's oil fields by Continental-Emsco.

. . Equipmen

THESE QUALITY ITEMS REDU

CONTINENTAL-EMSCO MATCHED DRILLING EQUIPMENT

Don't take hoisting and rotating equipment for granted. We don't at Continental-Emsco. From crown block to rotary, each item meets C-E's high standards of design, engineering, manufacturing, inspection and service. This assures peak performance and



gives you engineering superiority . . field proven dependability . . worldwide service

long life. All Continental-Emsco equipment is backed up with *experienced* field service and availability of parts throughout C-E's *worldwide* sales and service organization.

Continental-Emsco can equip any rig with blocks, swivels and rotary machines designed, engineered and field proven for top rig efficiency and faster, trouble free drilling operation.

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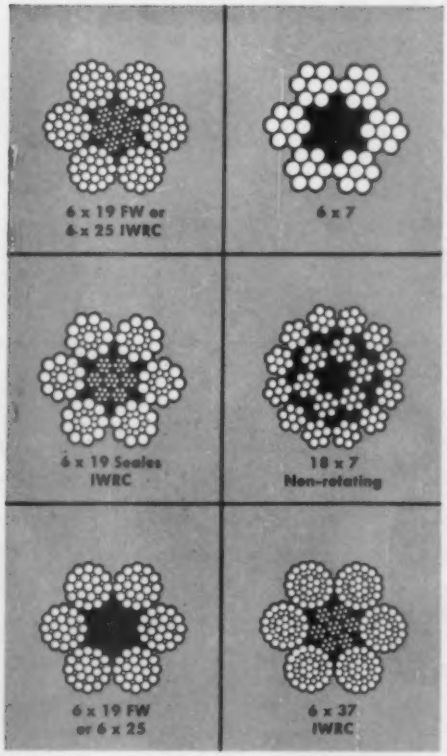
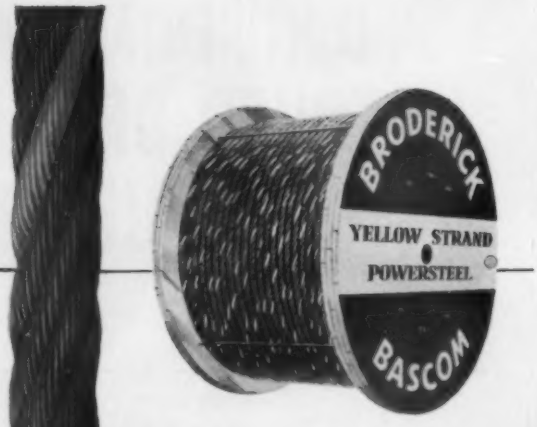
DUCE DRILLING DOWNTIME

Standardize on

Yellow Strand®

"POWERSTEEL"





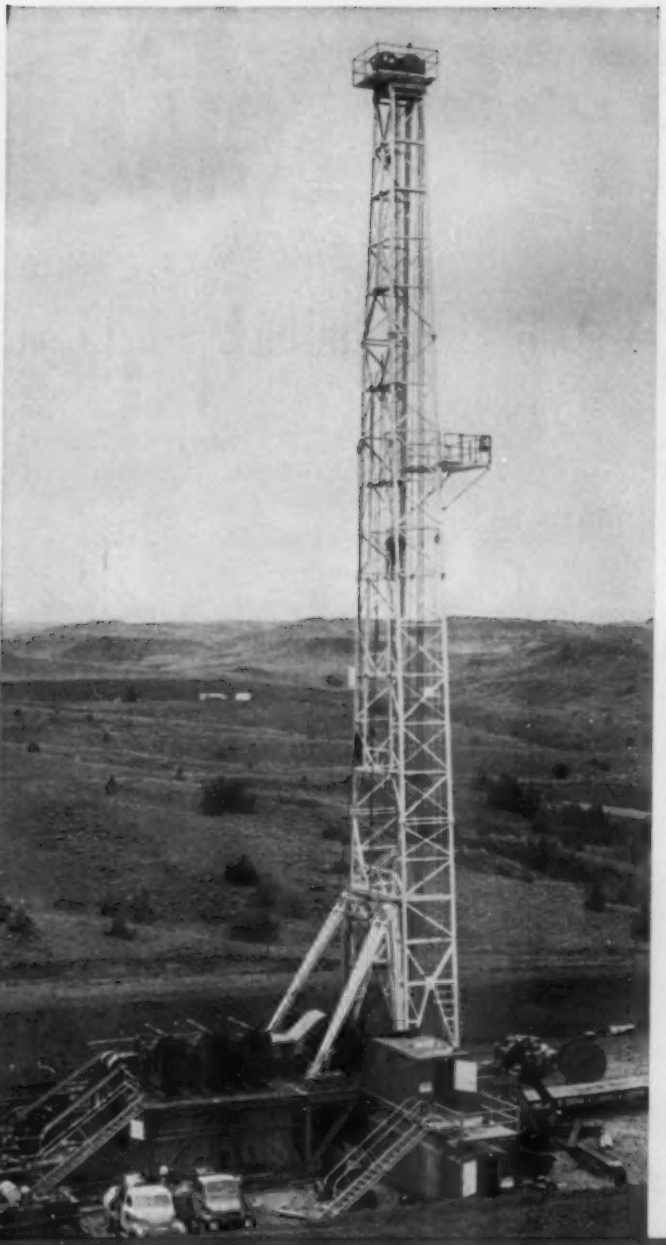
If you need a wire line *today*... *tomorrow's* too late. That's why it pays to standardize on Yellow Strand... the oil country's most dependable wire rope that's *in stock every day* at your nearby Continental-Emsco store.

Store stocks are backed up by Broderick & Bascom warehouses at Peoria, Houston, New Orleans, St. Louis, Seattle and Los Angeles. You can be assured that the size, construction and grade of rope you standardize on will be ready for immediate delivery at all times.

Discuss wire rope with our store people and select the grade and size that will give the longest wire line life possible for your money.

for Service

SUPPLIES AND SERVIC



CONTINENTAL-EMSCO
Drilling Masts

the preferred mast for land or marine rigs

Portability and *ruggedness* . . . the features most preferred by contractors and drillers . . . have been designed and built into the new Continental-Emsco B-Series masts. In addition, the open face mast design provides greater block clearance for faster, safer block travel, and unimpaired visibility.

Faster erection is now possible with these *field proven* features: (1) rear leg pivot and ground level assembly; (2) simplified pin connections for all mast sections; and (3) positive line control during raising and lowering, eliminating the need for snubbing lines.

Positive line control also makes these masts ideally suited for barge installations, since they can be quickly lowered . . . *without snubbing lines* . . . when approaching over-water obstacles . . . or when severe weather sets in.

Discuss your drilling mast requirements with your Continental-Emsco man.

Sizes: B-127, B-133, B-134 and B-142.

that Sings..

CE THROUGHOUT THE DRILLING WORLD

"Jim . . pick out the kind and size you want"

This tool pusher knows that at Continental-Emsco he'll find a wide selection of sizes, types and designs of everything he needs. This wide variety of products saves his time by making *one-stop buying* possible. And he also knows he'll receive prompt, *personalized service* from our store people and continuous follow up and checking of factory shipments.

Don't neglect the advantages of . . *in person buying* . . at your nearby Continental-Emsco store.

CONTINENTAL-EMSCO

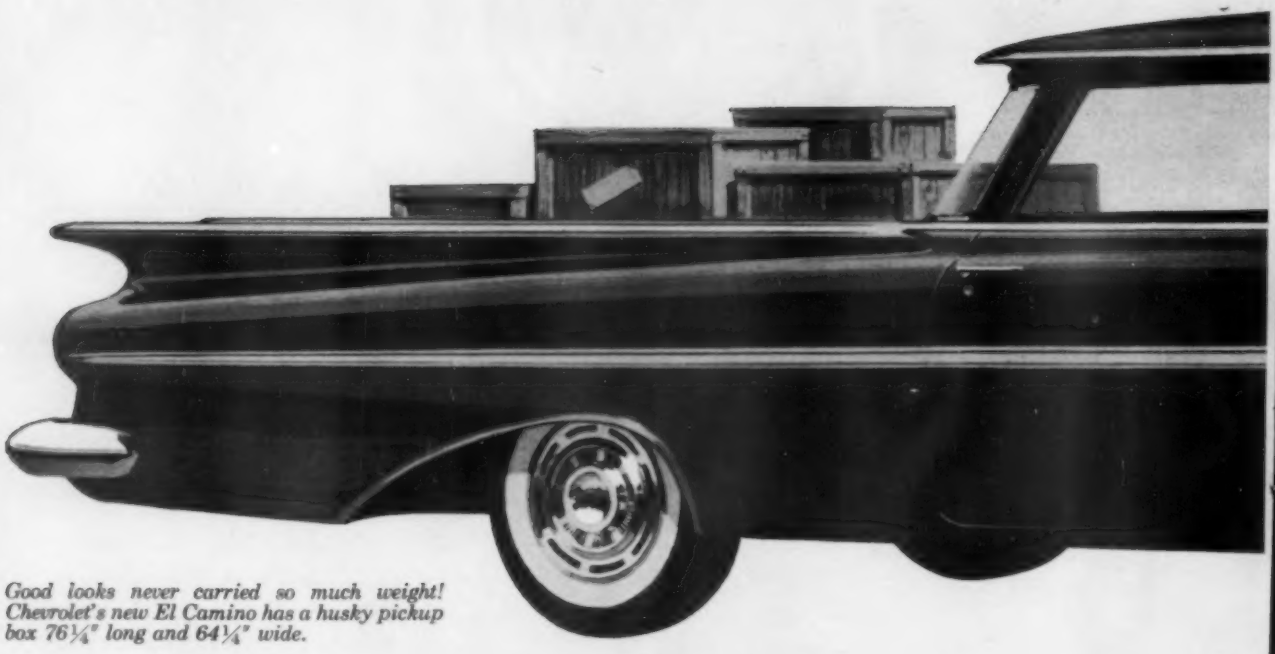
Serving the Oil and Gas Industries ... Worldwide

CONTINENTAL-EMSCO COMPANY • A Division of The Youngstown Sheet and Tube Company • General Offices, Dallas, Texas
Export Division, 45 Rockefeller Plaza, New York, N. Y. • Continental-Emsco Company Limited • General Offices, Calgary, Alberta, Canada
Continental-Emsco Company C. A., Caracas, Venezuela • Plants: Los Angeles • Houston • Garland, Texas • St. Albans, Herts., England
Representatives in All Principal Oil Fields of the World

..Go CONTINENTAL-EMSCO

Make visiting your Continental-Emsco store a regular habit when you're in town.

V820



Good looks never carried so much weight! Chevrolet's new El Camino has a husky pickup box 76¼" long and 64¼" wide.

Any kind of load rides better (and more economically!) when pulled by a 1959 Series 40 Chevy! From new thriftier Thriftmaster 6 to extra-rugged rear axle, they're the best built middleweights yet!

Here are two handy, hard-working '59 Chevrolets . . . the new Stepside pickup with convenient side running board, and the new Suburban Carryall that serves as either a cargo carrier or 8-passenger vehicle!

THE BEST YET OF THE BEST SELLERS . . .

CHEVROLET

TASK·FORCE 59 TRUCKS

CHEVROLET

For '59, the brightest new ideas in trucks are Chevrolet's! There's the glamorous new El Camino to set a new standard in styling . . . new features and refinements in every model to set new records for saving!

Chevy's serving up something special for '59—the soundest, savingest, sharpest looking line of haulers that ever hustled a load! For evidence, consider the dazzling all-new El Camino. It combines the slimlined beauty of the '59 Chevrolet passenger car with the ability to handle man-size hauling jobs!

Or take the pickups of Task-Force 59—a *dozen* big-bodied beauties that can fill the bill on scores of jobs with five handsome Fleetside models, seven handy Stepside pickups, including 4-wheel drive models. A new edition of the famous Thriftmaster 6, standard in light-duty models, delivers up to 10% greater fuel economy—up to 20% with new maximum economy option.*

And the picture's just as bright in the medium- and heavy-duty classes. Here, you'll find V8 power that's new and tougher built, too . . . with axles, transmissions, frames and brakes that are refined and improved to whip the toughest runs without a wheeze or whimper.

Whether your truck is a light-, medium-, or heavy-duty job, *these* are trucks you've got to see! They're on display right now at your Chevy dealer's. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

**Optional at extra cost.*

NEW MIGHT, NEW MODELS, NEW MONEY-SAVING POWER!

PERFECT CONTROL

Drill pipe is always under perfect control when your rig is equipped with a Parkersburg Hydromatic Brake. A Hydromatic Brake is safer than any auxiliary drawworks brake in the field today . . . That's why so many deep hole records for the past 25 years have been set with rigs equipped with a Hydromatic Brake.

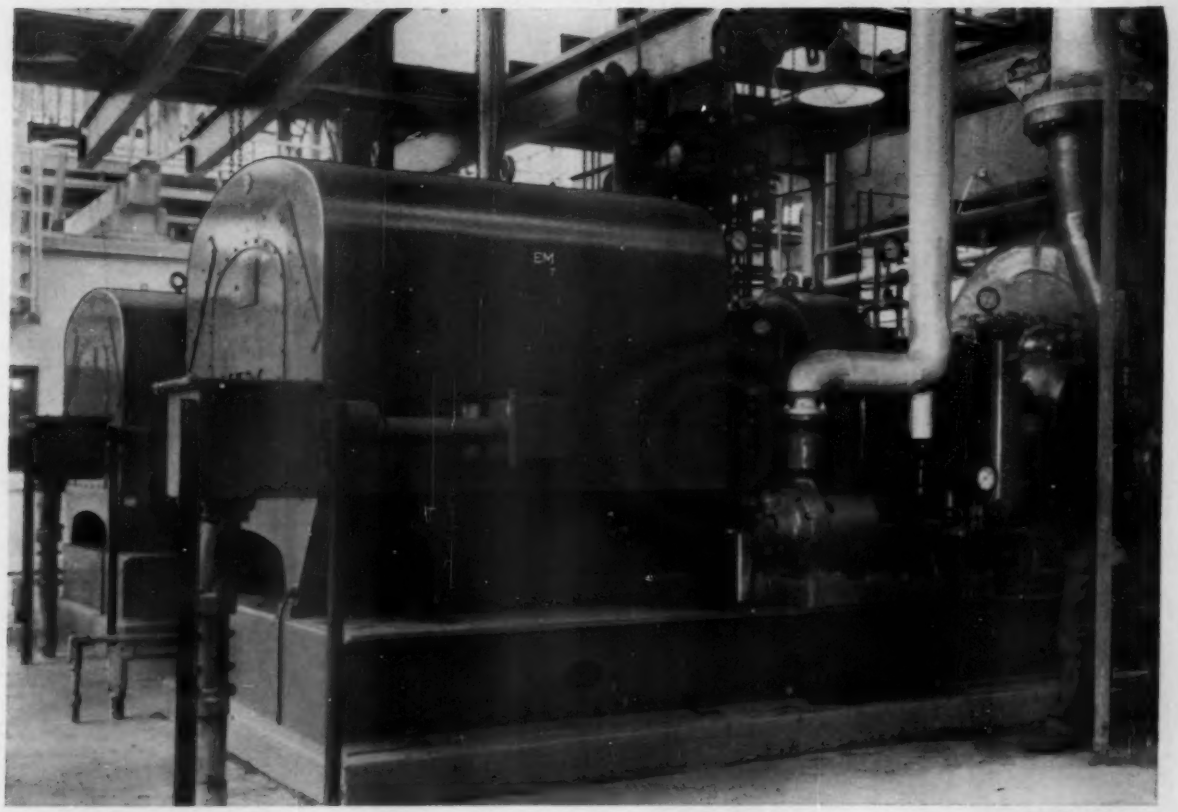
For the best insurance against runaway pipe, for perfect control at all times, install a Parkersburg Hydromatic Brake on your rig.

THE PARKERSBURG RIG AND REEL CO.

THE PARKERSBURG RIG & REEL COMPANY

Division of Parkersburg — Aetna Corp.

DRILLING & SPECIALTIES DIVISION OFFICES: P. O BOX 1160, PARKERSBURG, WEST VIRGINIA



Compressor drives . . . outdoor style!

● Right outdoors in Canadian weather are these two E-M Weather-Protected Induction Motors at the Vancouver, B. C. refinery of Imperial Oil Co., Ltd.

Rated at 1500 hp, 1750 rpm, the Motors drive centrifugal compressors and are among the largest such drive units built to date for outdoor installation without total enclosure.

This installation demonstrates two important advantages of E-M outdoor drives:

FIRST, E-M Weather-Protected Motors do not require expensive indoor floor space.

SECOND, their weather-protected construction allows them to be installed outdoors, away from explosive atmospheres.

E-M Weather-Protected Induction Motors have many other advantages as well. No special foundations are necessary. The protective hood sheds falling or blowing precipitation. Screened air intakes located above the motor feet prevent the entrance of refuse. And because ventilating air enters at low velocity, suspended particles are dropped before they reach vital motor parts.

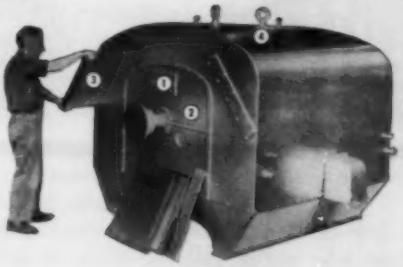
Special "blow-through" passages provide a by-pass for high velocity gusts of wind. Protective coatings guard the motor interior and exterior from weather hazards. Even with this extensive protection, access is quick and simple without dismantling the motor.

Find out how these E-M Weather-Protected Motors, located outdoors, can cut installation costs and reduce danger on pump or compressor drives. Call your nearest E-M Sales Engineer for full information. Write the factory for E-M Synchronizer No. 40, the special oil industry issue, showing Weather-Protected Motor installations.

ELECTRIC MACHINERY MFG. COMPANY
MINNEAPOLIS 13, MINNESOTA

PROTECTION WITH ACCESSIBILITY!

1. Door plates unlock quickly for handy access to bearing filler cap and oil ring inspection hole.
2. Large end plates permit bearing inspection, air-gap measurement, or blow-out of interior.
3. Intake air filters are easily removed for inspection or replacement.
4. Entire "weatherized" steel hood lifts by eyes for "all over" cleaning.



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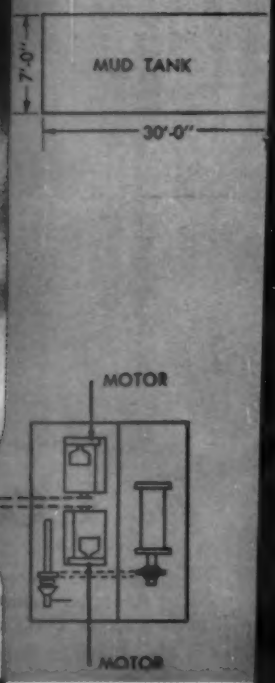
E-M

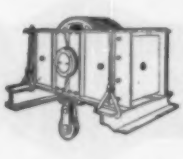
Specialists in making motors do exactly what you want them to

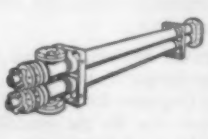
ALCO OIL FIELD EQUIPMENT

DON'T LET STEAM STEAL YOUR PROFITS

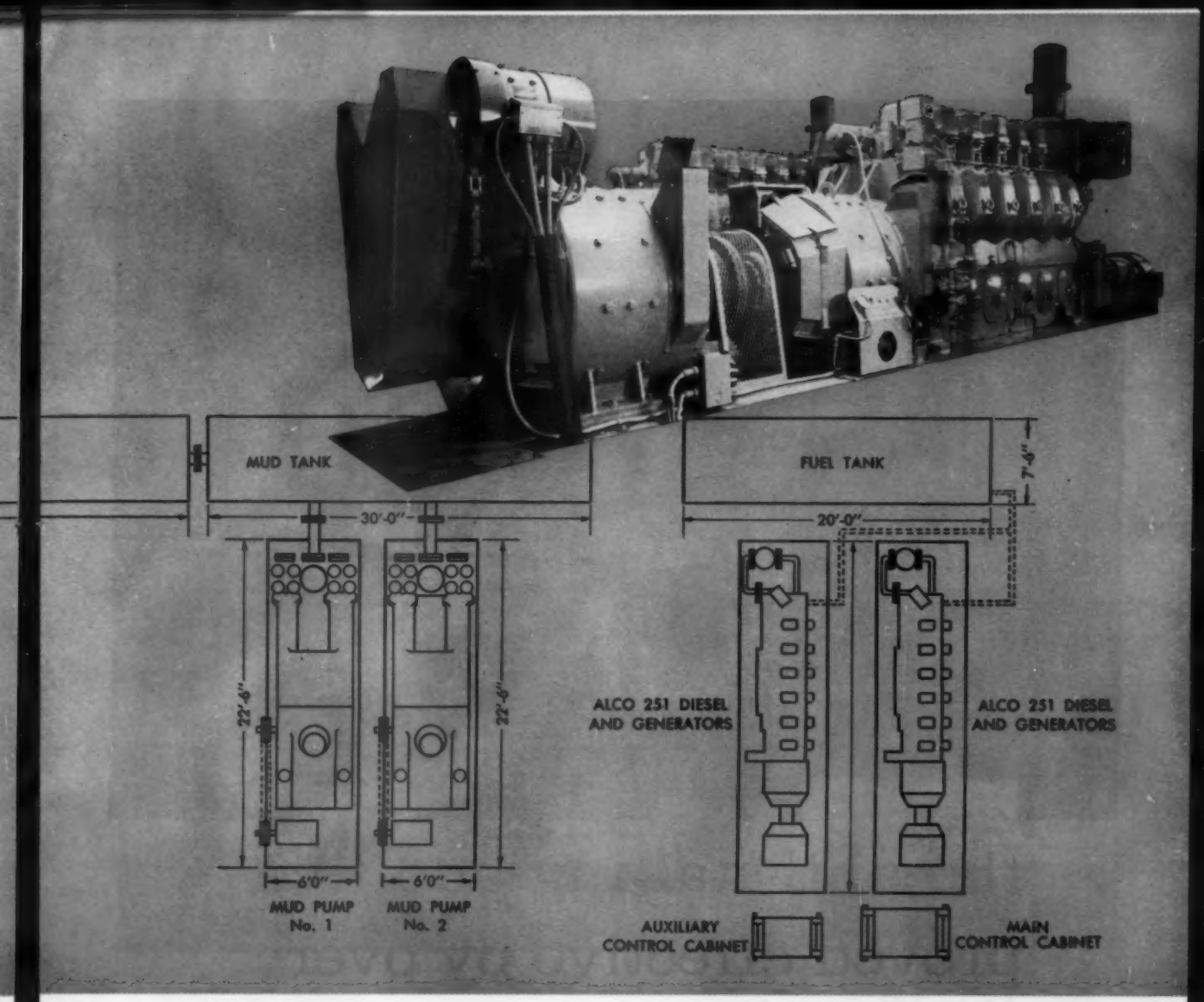


PLUG





Crown and travelling blocks • *Wellhead equipment* • *Finned tube products* • *Kinney plug injectors* • *Oil-field valves*



IN ALCO DIESEL-ELECTRIC POWER

Put yourself back into competitive bidding—at a better profit—with diesel-electric drilling power by ALCO. Utilizing the famed ALCO 251 diesel, this modern and most economical way to drill will cut your fuel cost, compared to steam power, by as much as 60 per cent. The fuel savings alone in four years can pay for the cost of ALCO power.

You'll save again when moving to new locations, because ALCO power weighs 30 per cent less than steam boilers. You'll realize a further saving through a 10 per cent reduction in rig-up time.

ALCO diesel-electric drilling power is designed, engineered and assembled in Beaumont, Texas, by men who know drilling problems. In three years' field use it has demonstrated its advantages over other comparable diesel power with less fuel consumption, easier maintenance and more efficient electrical operation.

Field engineers trained in the operation and maintenance of ALCO drilling power are located in Houston, Beaumont, New Orleans, and Biloxi. Parts are stocked in Beaumont and Odessa. For complete information on all the savings and advantages of ALCO power, write ALCO Products, Inc., Petroleum Industry Equipment Division, Dept. 187, Bank of the Southwest Building, Houston 2, Texas.

ALCO

ALCO PRODUCTS, INC.
Petroleum Industry Equipment Division
HOUSTON

GULF AGENT 178

the anti-stalling additive proved effective by over

4 YEARS

use in millions of cars!

Your customers have sure protection against carburetor icing when you stall-proof your gasoline with Gulf Agent 178 . . . the additive that has provided over fifty billion miles of stall-free driving in major brands of gasoline. It's inexpensive . . . blends readily in all petroleum products . . . and is also an effective rust inhibitor. Gulf Agent 178 can make your gasoline a better, more saleable product. Let us show you how. Write or phone.

Petrochemicals Department
GULF OIL CORPORATION, GULF BUILDING, PITTSBURGH, PA.
QUALITY CHEMICALS *from* PETROLEUM

GULF®

AAF Type W Cycoils assure clean air to gas compressors at this field processing plant of the Odessa Gasoline Company in Ector County, Texas.

AAF Cycoils protect compressor equipment day-in-day-out— require little maintenance

Why are AAF Cycoil oil bath air cleaners used for so many unmanned pumping stations and automatic plants? The reason is simple: Cycoils are known and *trusted* for dependability and efficiency. What's more, they require only infrequent maintenance because filter pads are self cleaning. Periodic replacement of oil is all that's required.

Cycoils' method of intermixing oil and dust-ladened air traps 90% of the fine dust particles before they ever reach the final filter pads. That's why Cycoil-cleaned air is virtually 100% dust-free!

Whether it's a pulsating action or smooth flow application, involving packaged or stationary compressors, there's a Cycoil of a type and capacity to meet your needs. Write today for bulletins describing the complete line of Cycoil oil bath air cleaners.

American Air Filter
COMPANY, INC.

444 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

Type CMS Multi-Duty Filters

Type G Pipeline Air Filters

— BETTER AIR IS OUR BUSINESS —

Type OCH Intake Air Filters

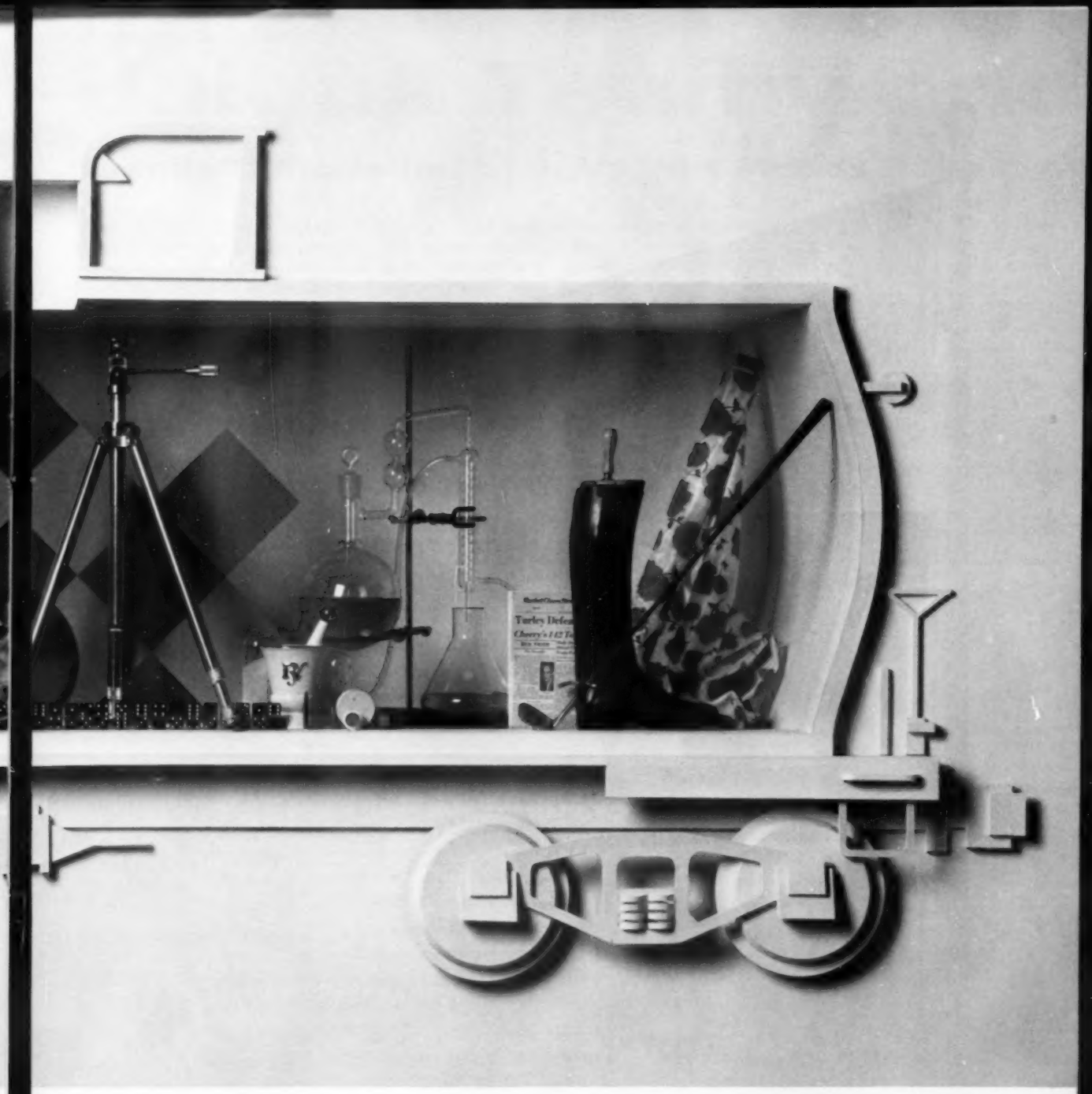
Cycoil Oil Bath Air Filters

COLUMBIA-SOUTHERN CHEMICALS CREATE

SALES MAKE MORE PROFITS when they're balanced carefully against product development, processing, and marketing costs. That's the big reason you look so closely at the total "package" you get when you buy such essential materials as chemicals.

Naturally, you start with dependably high-purity basic materials. You require on-schedule delivery, geared to your specific handling and use. Perhaps most of all, you want the kind of practical, market-conscious technical assistance that helps open new fields for your present or contemplated products. In brief, you need a chemical partner, not simply a supplier. So hard to locate? Not at all. Naturally, you're thinking of:

Columbia-Southern Chemical Corporation, One Gateway Center, Pittsburgh 22, Pennsylvania. Offices in fourteen principal cities. In Canada: Standard Chemical Limited.



PROFITABLE SALES FOR YOUR PRODUCTS

CHLORINE regroups molecules for economical processing of plastics, solvents, paper products, wonder drugs, hundreds of products.

CAUSTIC SODA and its voracious appetite work thriftily to produce textiles, packaging films, petroleum products, innumerable goods.

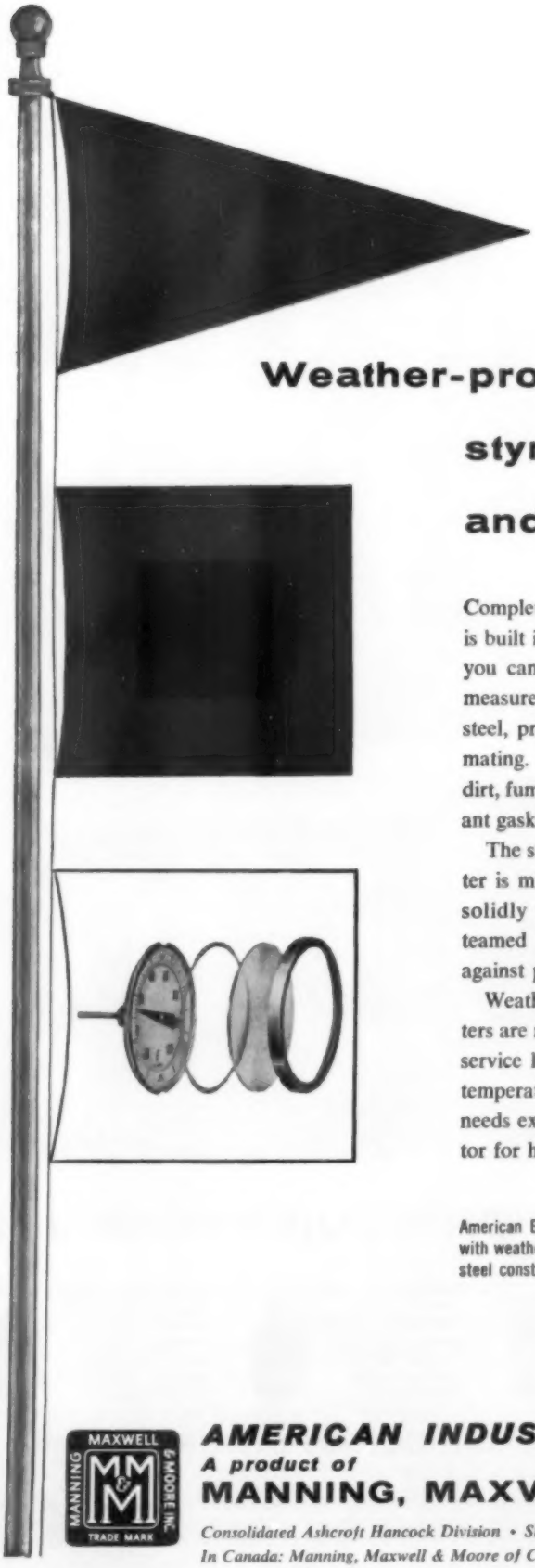
SODA ASH is indispensable to the manufacture of glass, soaps and detergents, metals, pigments, other chemicals.

RUBBER PIGMENTS improve natural and synthetic stocks, make possible use of sales-spurring colors in quality rubber goods.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

A Subsidiary of Pittsburgh Plate Glass Company

Anhydrous Ammonia, Benzene Hexachloride, Calcium Chloride, Calcium Hypochlorite (Pittchlor®, Pittabs®), Carbon Tetrachloride, Caustic Potash, Caustic Soda, Chlorine, Chlorinated Benzenes, Chloro-IPC, Chrome Chemicals, Hydrogen Peroxide, Muriatic Acid, Pacific Crystals, Perchlorethylene, Rubber Pigments (Calcene®, Hi-Sil®, Silene®), Soda Ash, Soda Briquettes, Sodium Bicarbonate, Sodium Sulfate, Titanium Tetrachloride, Trichlorethylene



Weather-proof construction stymies erosion and corrosion

Complete protection against erosion and corrosion is built into American Bi-Metal Thermometers, so you can always be sure of accurate temperature measurement. Both case and bezel are stainless steel, precisely fitted and gasketed to insure snug mating. Whatever the weather, rain, sand, dust, dirt, fumes and frost are sealed out by a heat-resistant gasket between case and thick cover glass.

The stem of the American Bi-Metal Thermometer is mirror-smooth stainless steel. All joints are solidly welded. Top resistance to corrosion is teamed with strength, rigidity and tight closure against process pressures.

Weather-proof American Bi-Metal Thermometers are noted for high sustained accuracy and long service life. There are mounting styles, dial sizes, temperature ranges and stem lengths to meet your needs exactly. Ask your industrial supply distributor for help in proper selection.

American Bi-Metal Thermometer with weather-proof stainless steel construction.

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AMERICAN INDUSTRIAL THERMOMETERS

A product of

MANNING, MAXWELL & MOORE, INC.

Consolidated Ashcroft Hancock Division • Stratford, Connecticut

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

Unique Teamwork

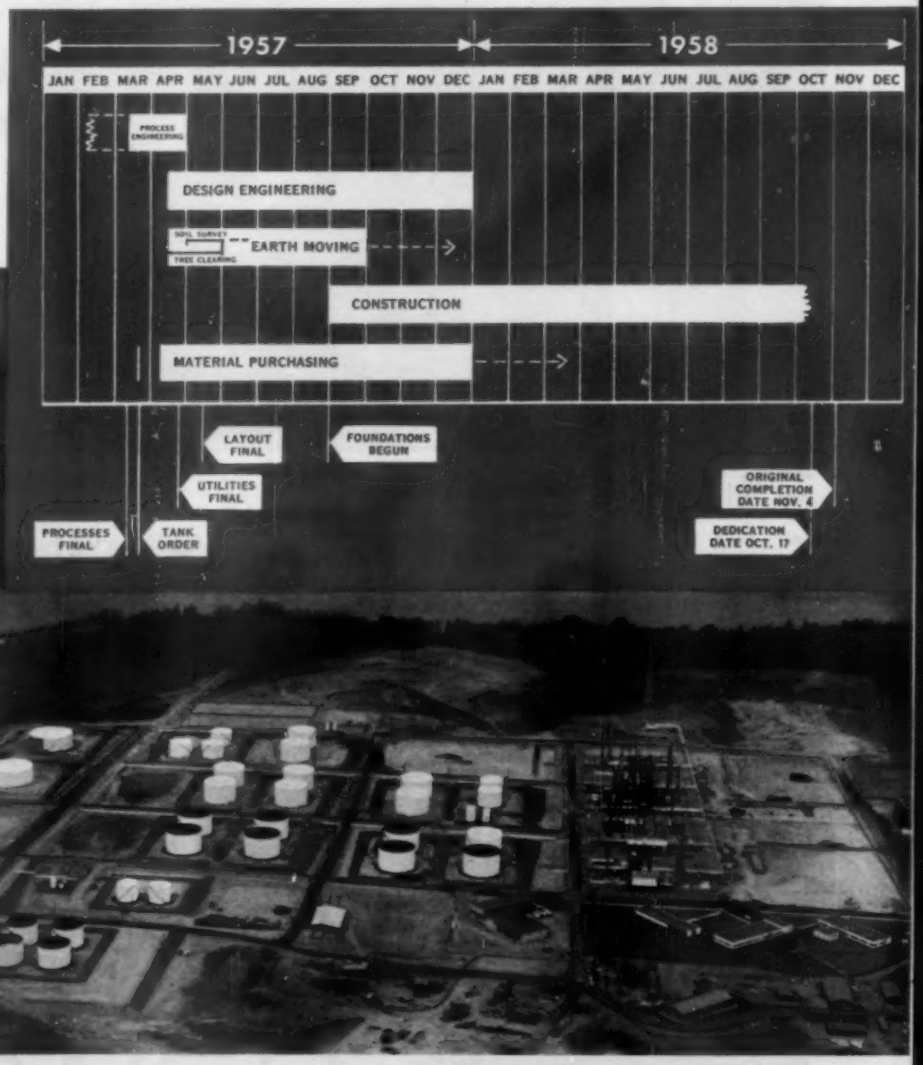
Speeds Completion of B/A's Port Moody Refinery

Foreseeing unusually rapid changes in the West Coast marketing situation, the British American Oil Company in the Spring of 1957 decided a new "grass roots" refinery was required in the Vancouver area by the Winter of 1958. Eighteen months or so is a short time to plan and execute a refinery project. Canadian Kellogg's accomplishment of this unusual speed record is a testimony to the B/A organization and its ability to delegate decision-making. Working with a special team of B/A engineers who could make decisions "on the site", Kellogg completed the project ahead of schedule.

One of the first things Canadian Kellogg required were horses—the only transportation the engineers could use to negotiate the muddy conditions on the site. But a strategically placed drainage and pumping system soon dried the ground and proved so effective that after its installation not one day's labor was lost through wet conditions. Other practical solutions to construction problems, plus the most advanced chemical engineering, have made the investment per barrel capacity of the B/A Port Moody refinery relatively very low.

Right from the start Canadian Kellogg's experience and B/A's cooperation pushed the job ahead of schedule. Of course, B/A and Canadian Kellogg have worked together before. The Port Moody contract was awarded to Canadian Kellogg mainly on past performance . . . this move in itself saved the time and money normally spent preparing and analyzing detail bids. Mutual respect between client and contractor was one of the outstanding factors that contributed to the speedy completion of the project.

Right: *Chart shows rapid construction progress made on the Port Moody project.* Below: *Air view of new B/A Port Moody refinery, Vancouver, British Columbia. Process section, right, is subdivided into five areas: (1) Crude Unit, (2) Catalytic Reformer and Distillate Desulfurization Unit, (3) Utility Plant, (4) Orthoflow® Fluid Cat Cracker, and (5) Alkylation Unit.*



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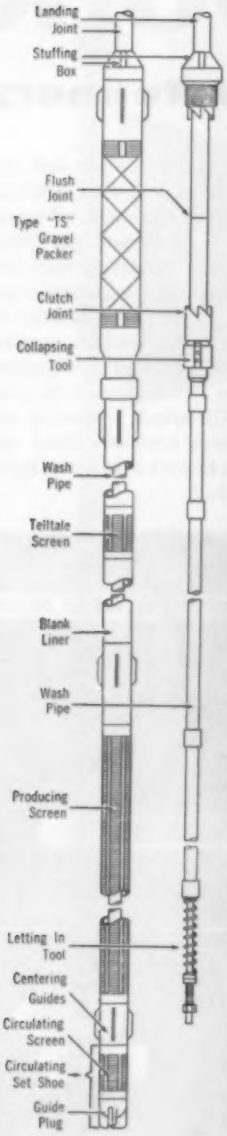
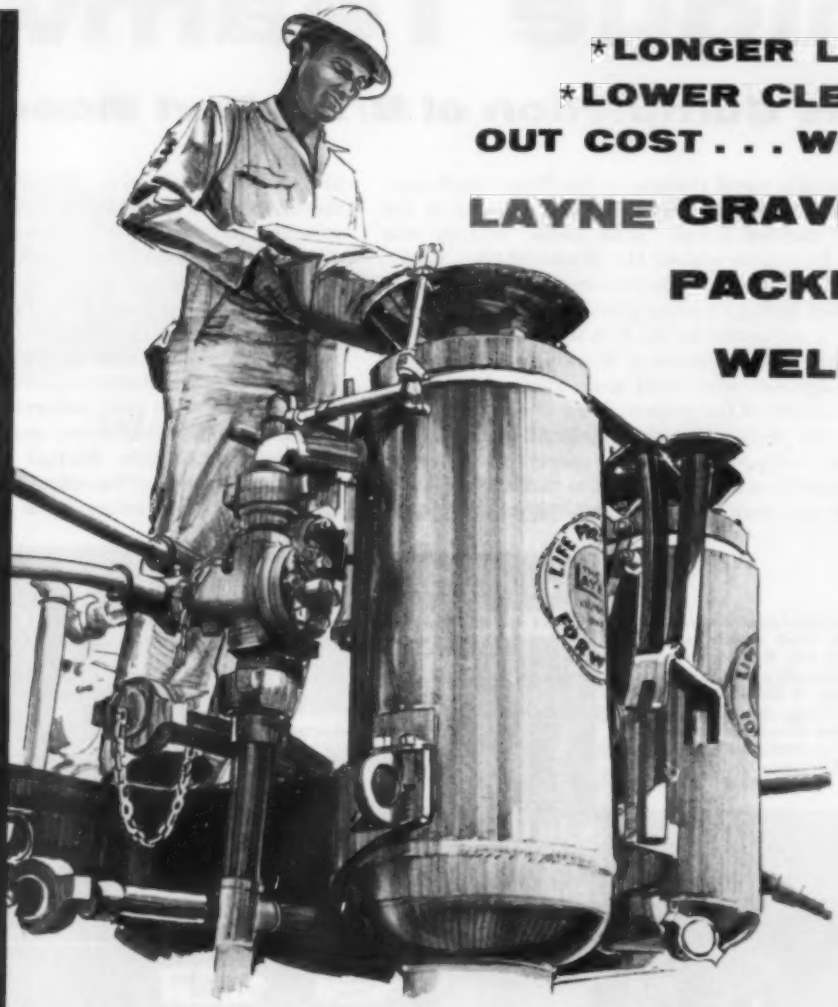


Reverse Circul'n Setting
(with circulating set shoe)



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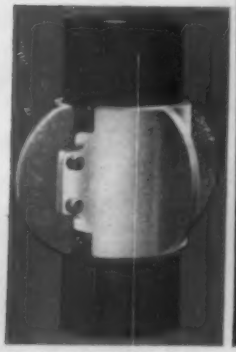
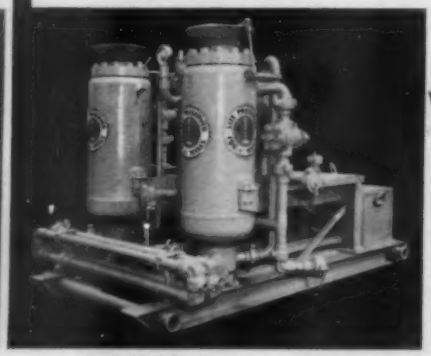
Gravel supports the formation, filters out sand, and distributes flow over entire strainer section. Coarse gauge strainer can be used.

Results *lower velocities
*longer life
*less clogging



Alum. Centering Guide



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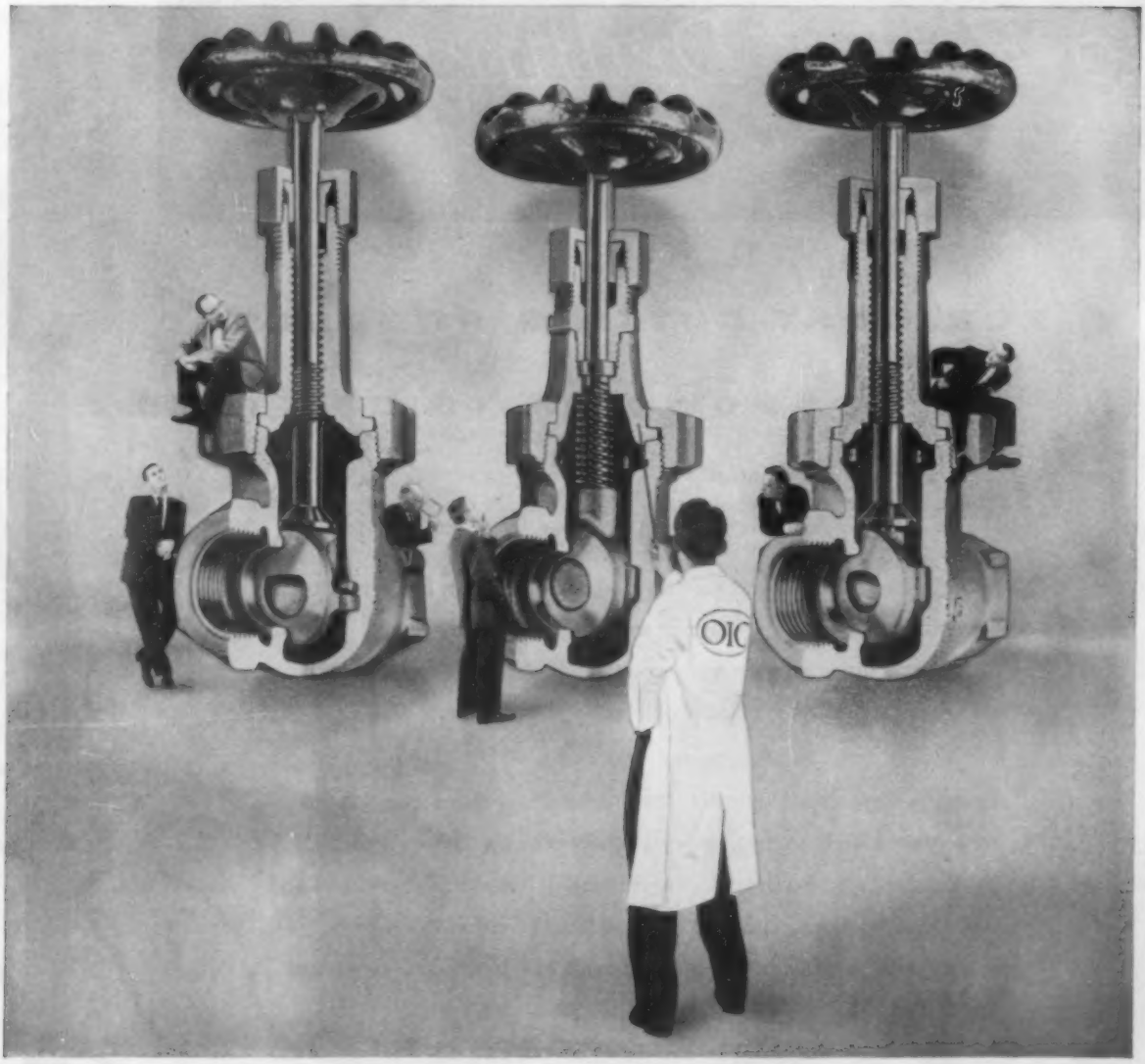
...3 gate valve types in 3 pressure classes, gentlemen, all with safe, efficient (and effective) union ring joints



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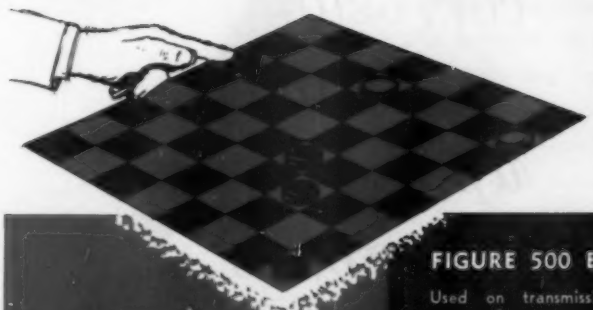

FIGURE 500

FIGURE 500 BLANK CAP

Used on transmission systems the world over for scraper traps, strainers, blowdowns and other installations requiring a "blanking" end. All sizes to 38", in ASA Series 150 through 1500, with or without hinges. Features O-Ring seal, 2-piece design.

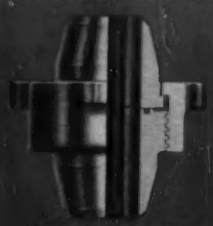

FIGURE 505

FIGURE 303 MIS-ALIGNING UNION

Provides for 7½° mis-alignment in any direction without losing pressure seal. Mating parts move on arcs of a common circle to give smoothest mis-aligning movement. Ideal for use where temperature extremes cause expansion and contraction. Sizes to 8", for working pressures to 5000 psi.

FIGURE 303

FIGURE 505 WELDING UNION

Fills all requirements of the transmission industry for a "quick" connection. O-Ring provides positive seal against gas, liquids or vapors, pressure or vacuum. Withstands temperatures to 400° F. All sizes to 24", in ASA Series 600.

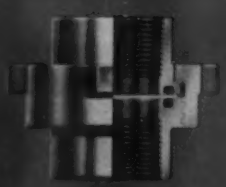

FIGURE 110

FIGURE 110 INSULATED UNION

Prevents electrolytic corrosion by breaking the flow of current. Non-conductor gasket has tremendous compressive strength — is resistant to all common acids, oil and gas. Double O-Rings assure positive seal. All sizes to 16", for working pressures to 10,000 psi.

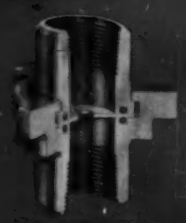

FIGURE 400

REPRESENTATIVES

W. H. Seyffert, Jr.—Corpus Christi, Texas
Slim LaGrone Co.—Odessa, Texas
Bob Hawk Eqpt. Co.—Hobbs, N. M.
Broiles & Cope—Wichita Falls, Texas
A. S. (Andy) Herron—Lake Charles, La.
C. B. Blair—Shreveport, La.
Louis Ray—Farmington, N. M.

Rocky Mtn. Spec. Co.—Casper, Wyo.
Howard Crider—Oklahoma City, Okla.
L. P. Kinnear—Great Bend, Kansas
Lee Snodgrass Co.—South Gate, Cal.
Neil Ginther—Wooster, Ohio
R. S. Stokvis & Sons, Inc.—New York
Thornton C. Hughes—Edmonton, Canada

FIGURE 400 CHOKE UNION

Regulates downstream pressure or volume through use of interchangeable orifice plates. Serves also as conventional union when full opening plate is used. All sizes to 4", for working pressures to 3000 psi.

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YALE MACHINE WORKS
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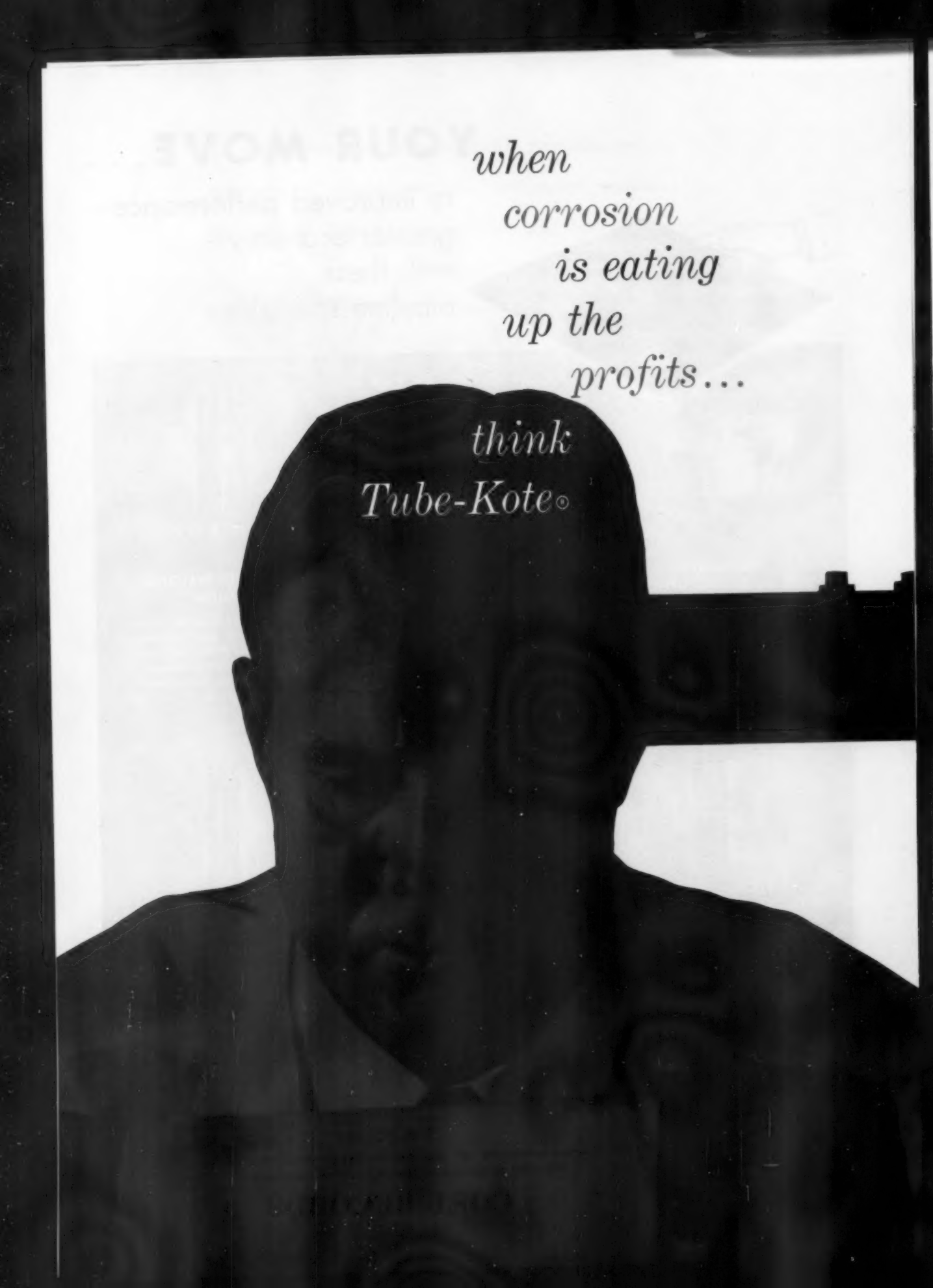
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corrosion
is eating
up the
profits...
think
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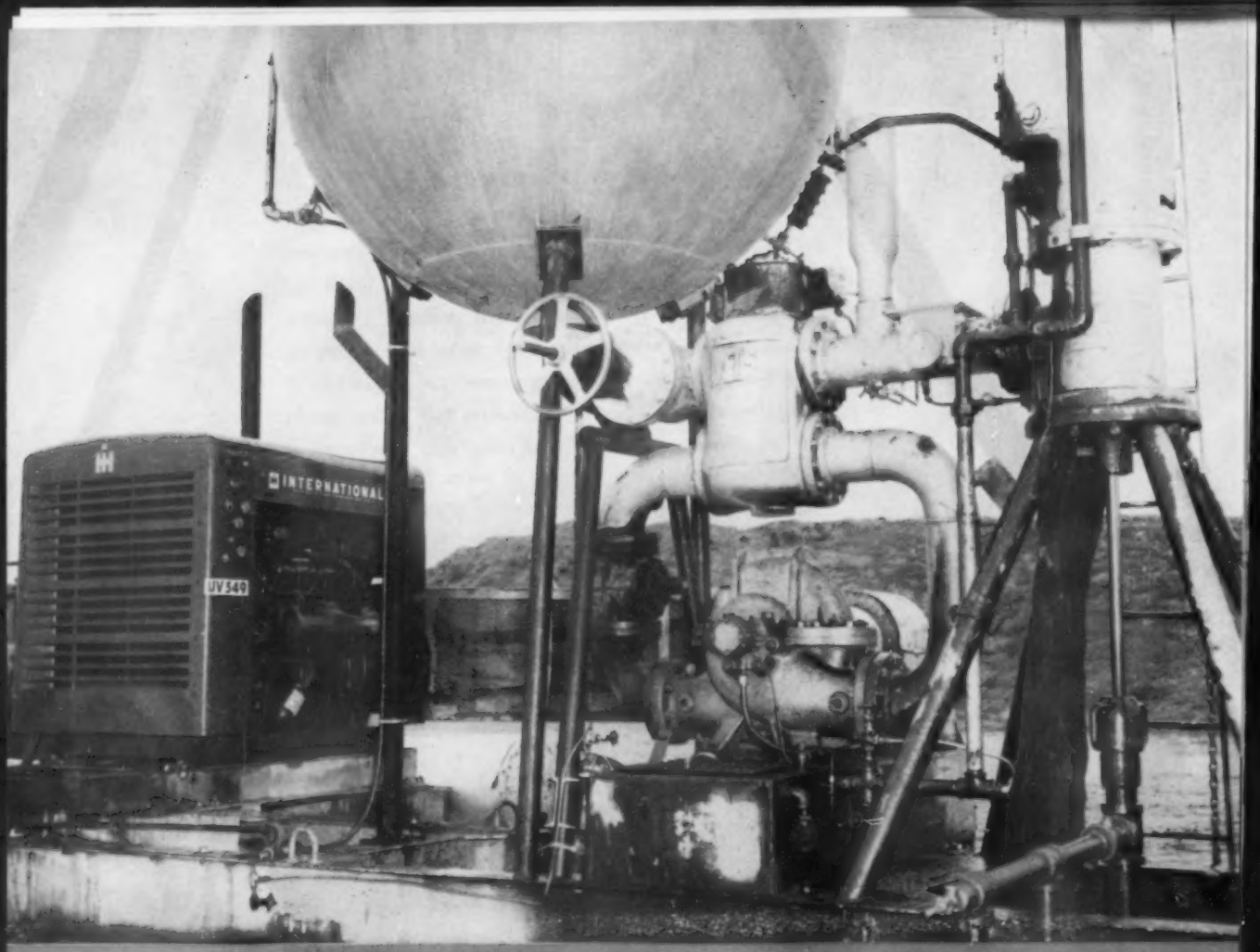

Modern Look in Smooth Oil Well Pumping Performance

This heavy duty International V-8 oil field engine owned by L. A. Harnish, operator, of Fresno, Calif., teamed with an Axelson long stroke hydraulic pumping unit, is the modern version of smooth oil field pumping performance.

Operating at low cost on gas from the well being pumped, this 549 cu. in. displacement V-8 cylinder unit is located in the Guajjarral Hills field 10 miles east of Coalinga, Calif. Long periods without service attention are made possible by use of a Ren oil level regulator and make-up tank, automatic safety shutoff controls, generous radiator cooling capacity with automatic thermostatic by-pass engine temperature regulation, and overall heavy-duty construction.

It will pay you to investigate the cost reductions possible with this new look in smooth power on your pumps, compressors, and drill rigs. Get full facts on the three new International V-8 and seven 6-cylinder natural gas engines from your nearby International Power Unit Distributor or Dealer. See how modern engine design combined with the best of accessories can be matched to modern oil field equipment to reduce your production costs. Call today and find how little it costs to switch to International.

International® **Construction Equipment**

International Harvester Co.,
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A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

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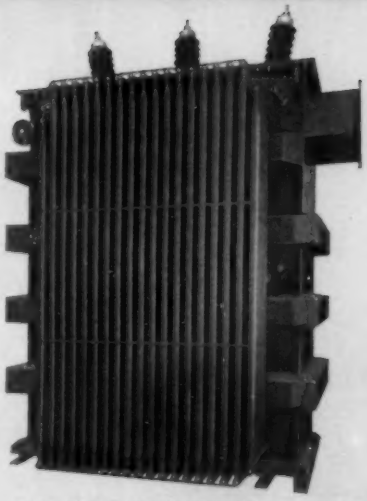


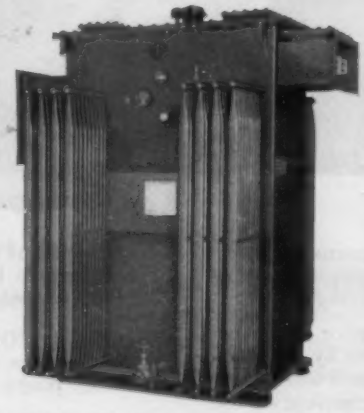
WAGNER INDUSTRIAL POWER TRANSFORMERS

Oil-filled, for outdoor installation, available through 10,000 kva, 67 KV and below. Noflamol filled, for explosive atmospheres, available through 7,500 kva, 15 KV and below.

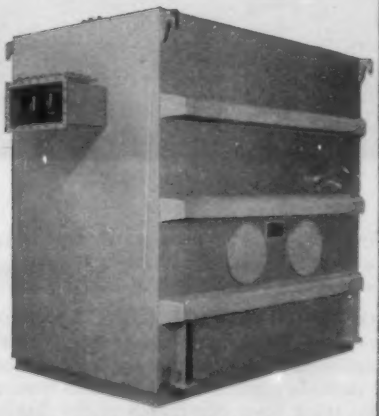
Wagner **UNIT SUBSTATION TRANSFORMERS**

112½ to 2000 Kva—three phase, 60 cycles, 15 KV and below

NOFLAMOL Non-inflammable liquid-filled. For indoor or outdoor installation, where explosive liquids or gases are present. The close-coupled design illustrated fits flush against switchgear enclosures. Throat connected designs are also available. 55°C rise, self-cooled or forced-air cooled.



OIL-FILLED Generally installed outdoors. Can be used indoors in fireproof vaults. Outdoor transformers can be connected to indoor switchgear using weather-proof bus-duct. 55°C rise, self-cooled or forced-air cooled.



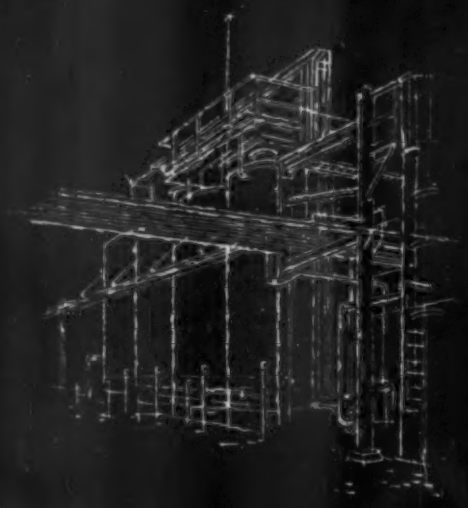
SEALED DRY-TYPE Suitable for indoor or outdoor use, completely fireproof, easy to clean and maintain. Sealed tank is filled with nitrogen under low pressure. Insulated for 150°C rise, self-cooled.

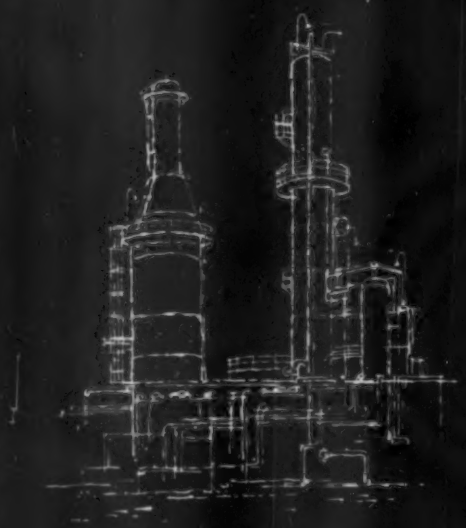
WT58-16A

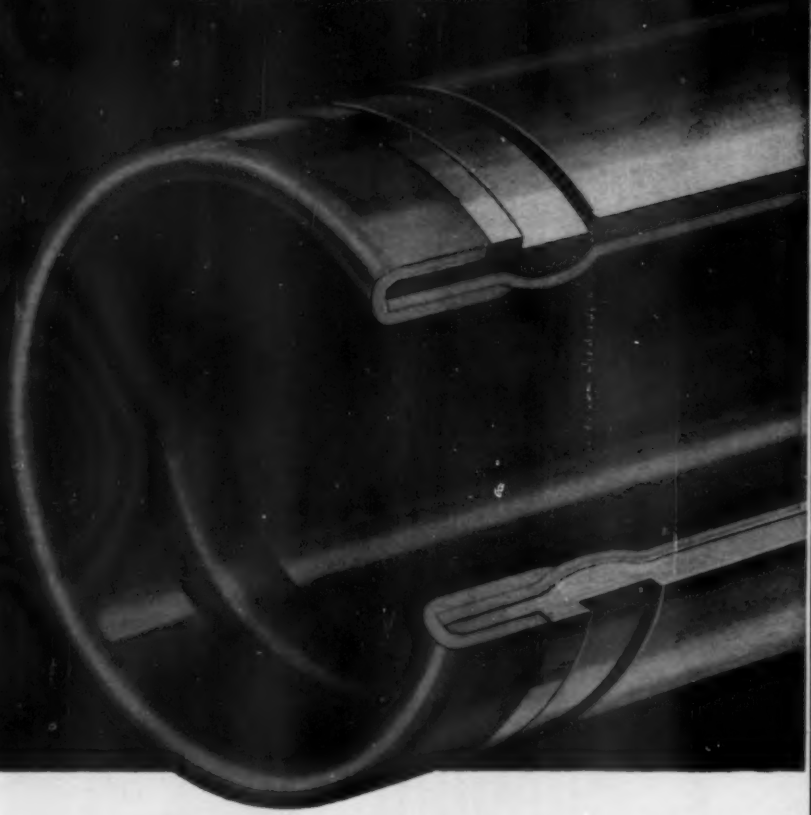
NEW "JAL-

handles corrosive liquids

- at pressures to 1000 P.S.I.
- at temperatures to 150°F.







New "Jal-Jacket" pipe, combining the corrosion resistance of rigid polyvinyl chloride with the strength of steel, offers you these cost-cutting advantages:

LONGER SERVICE LIFE. The superior PVC liner has corrosion-resistant properties required by the petroleum industry. The ends are fully protected with plastic to provide continuous protection from chemical attack. The thick liner eliminates costly flaking and pinholes. Steel jacket assures a tough, rugged product. Trial installations have been in service under severest conditions for two years.

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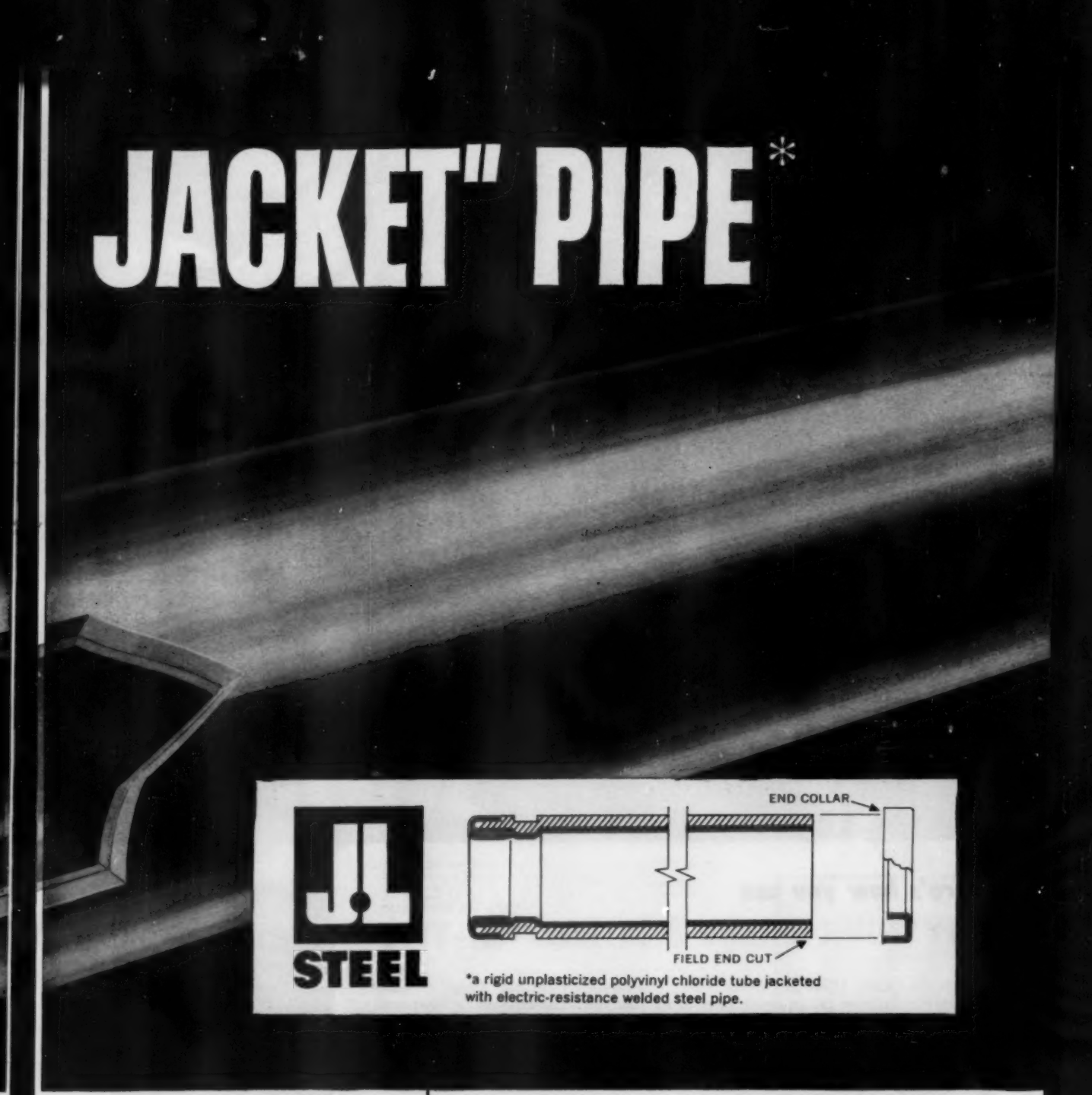

J&L STEEL

*a rigid unplasticized polyvinyl chloride tube jacketed with electric-resistance welded steel pipe.

"Jal-Jacket" is currently available in 20 foot mill lengths in three sizes, 2⅜", 3½", 4½" O.D. Get complete details by mailing this coupon today.

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(1) Ease of repair in the field—no special tools or skill required.
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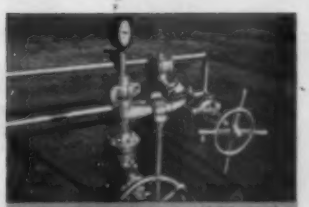
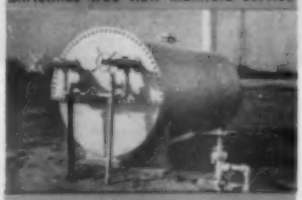
If specifying or buying valves is your job, let us give you the complete story on UNIBOLT Wing Valves.



Christmas tree flow manifold service



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Centralized production manifold

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"NO REPAIRS *on Wichita Clutches"*

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Vice President and
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FRED E. COOPER, INC.
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Cooper Skytop Model T4210-38 Self Propelled Oil Well Servicing and Workover Rig equipped with Wichita Air Tube Clutches . . . the entire rig is engineered and built by Cooper to do the most rugged oil field jobs with dependability and efficiency.

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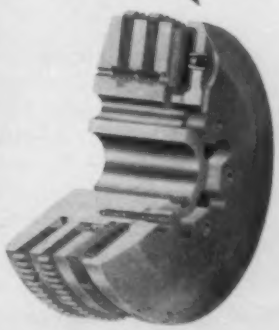
"Our customers like Wichita Clutches because they have smooth action, are dependable, and require no special attention or adjustment even when handling maximum loads."

Such a testimonial is typical of the enthusiastic approval of many users of Wichita Air Clutches and Brakes in a wide variety of industrial applications. For prompt assistance in solving your clutch or brake problems call or write the nearest Wichita Clutch office.

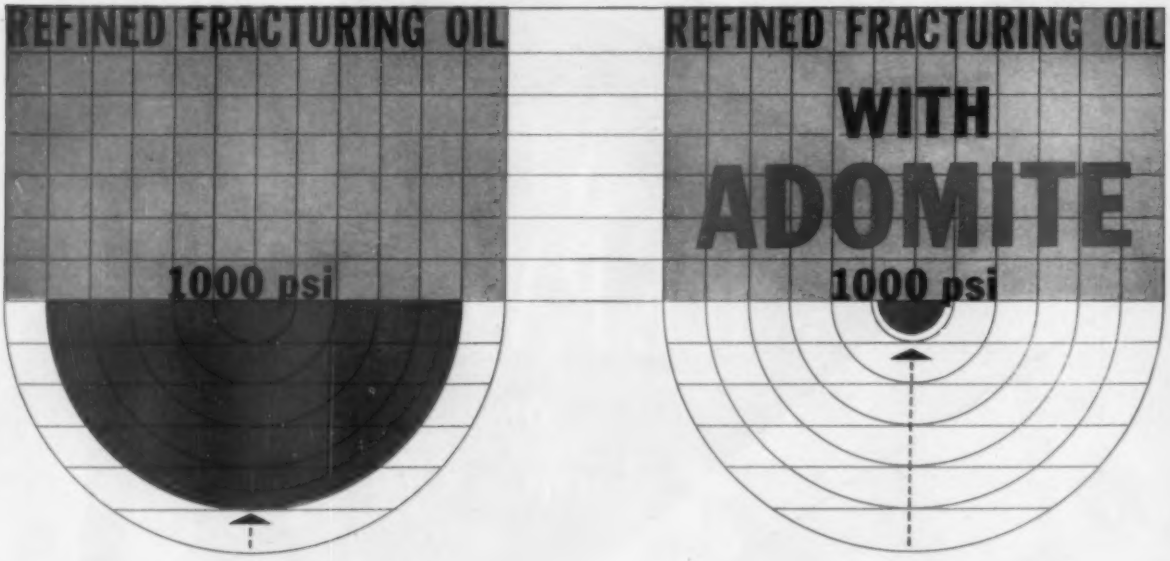


Wichita Standard
Ventilated Air-Tube
Disc Clutch

WICHITA Clutch COMPANY, INC.
WICHITA FALLS, TEXAS, U. S. A.

Contact your nearest Wichita Engineer!

Brehm-Lahner, Inc., Detroit, Michigan
L. H. Fremont, Cincinnati, Ohio
W. G. Kerr Company, Pittsburgh, Pa.
Smith-Keser & Co., Avon, Conn.,
Philadelphia 44, Pa., and New York, N. Y.
Frank W. Yarline Co., Chicago, Illinois
Larry W. McDowell, Long Beach, California
Andrew T. Lobel, Denver, Colorado
Robert P. King Co., Cleveland, Ohio
Norman Williams, Houston, Texas
Allied Transmission Equipment Co.,
Kansas City 8, Missouri
Donald E. Harman, Dallas, Texas
C. Arthur Weaver, Richmond, Virginia
Malcolm S. Cone, Memphis, Tennessee
Dominion Power Press Equipment, Ltd.,
Burlington, Ontario, Canada
R. E. Kunz, Seattle 4, Wash.
W. G. Ballantyne Co., Portland 4, Ore.
Bates Sales Co., St. Louis 1, Mo.



250 CC fluid loss in 2 minutes*

40.5 CC fluid loss in 30 minutes*

WHEN THE PRESSURE IS ON...

you DO need an additive for fluid loss control

At the higher pressures so often necessary in fracturing, Adomite is needed to control fluid loss to get the greatest fracture area possible. For instance, when using refined fracturing oil *without* Adomite, the fluid loss at 1000 psi is 250 cc in just 2 minutes. Imagine what it would be over a greater period of time. The chart shows the decided difference Adomite makes in the effectiveness of fracturing fluids. Fluid loss is cut to a minimum.

Adomite works by temporarily sealing the pores of the rock matrix. Adomite not only retains its stability under extreme pressures but also under the highest temperatures. With this better stimulation technique, you can fracture larger areas and reach untapped resources. Adomite leaves no permanent seal on the fracture wall or any evidence that the formation had ever been sealed . . . because it permits lower viscosity with lease crudes, greater injection rates can be attained.

For your next fracture or refracture job, you can be sure of better results by using Adomite to minimize fluid loss. Specify Adomite through your service company.

	Fluid Loss cc/30 Min. 100 psi	1000 psi
Crude Oil + Adomite	8.8	19.6
Gelled Crude Oil	22.0	Inf.
Gelled Crude Oil + Adomite	6.0	16.5
Refined Frac. Oil	21.0	250/2 min*
Refined Frac. Oil + Adomite	18.0	40.5*

For more information, contact one of the individuals in your area . . .

R. T. Means
P.O. Box 431, Midland, Texas
Mutual 4-7411

H. L. Thomason
Casper, Wyoming
Phone 3-2[illegible]1

R. W. Hughes
Oklahoma City, Oklahoma
Central 2-1371

J. M. Foster
Wichita Falls, Texas
Phone 723-8181

ADOMITE®

... the additive for fracturing!

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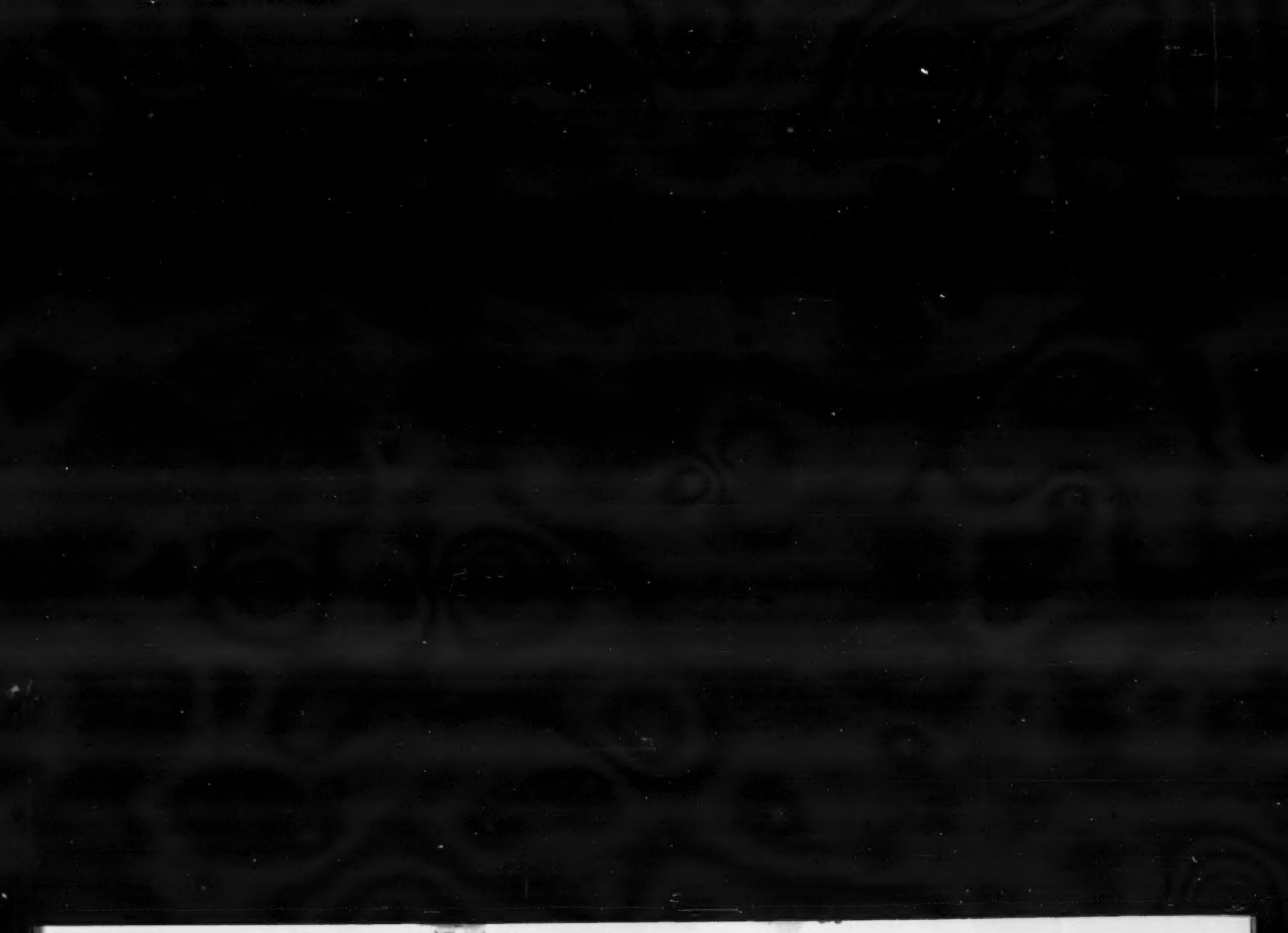
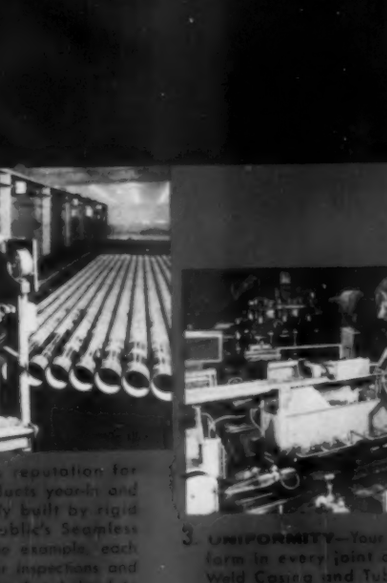


Republic Steel Is the Fastest Gro



Fastest Growing Major Because....

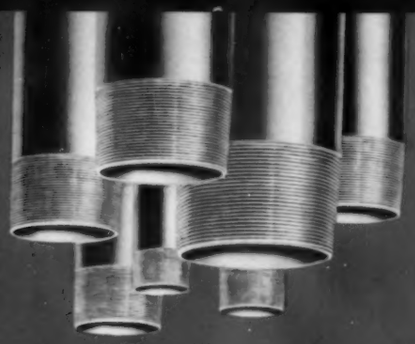
1. **EXPERIENCE**—Republic people know the oil industry as well as they know steel. For half a century, they've been working to improve steels, equipment, and manufacturing methods for oil country goods. Their success has made Republic the fastest growing "major" in Casing and Tubing.

2. **QUALITY**—Republic's reputation for furnishing quality products year-in and year-out has been solidly built by rigid quality control. At Republic's Seamless mill in Chicago, for one example, each joint is subjected to four inspections and five tests. Product quality has helped to make Republic the fastest growing "major" in Casing and Tubing.

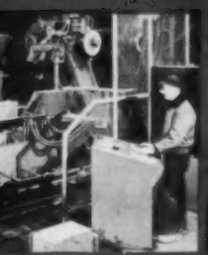
3. **UNIFORMITY**—Your
form in every joint o
Weld Casing and Tub
thickness. Uniform rou
yield strength. Unifor
the thread roots. Prod
helped make Republic t
"major" in Casing and

5. **FACILITIES**—Produced in the
modern mills, Republic Casing als
made by skilled craftsmen on the
in precision equipment. This com
facilities and abilities has help
Republic the fastest growing
Casing and Tubing.

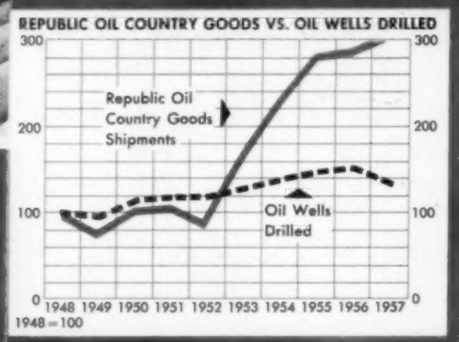
6. **RESOURCES**—Republic is
integrated—a big advantage
quality Casing and Tubing. From o
product, Republic watches over
production to insure uniform qual
production basis. Integration of
helped to make Republic the fas
"major" in Casing and Tubing.



rowing Major In Casing & Tubing!



4. DEPENDABILITY—good one more description of Republic Casing and Tubing. No matter how shallow or deep the well you can count on the dependability of Republic products throughout every joint in your string. Product dependability has helped make Republic the fastest growing "major" in Casing and Tubing.

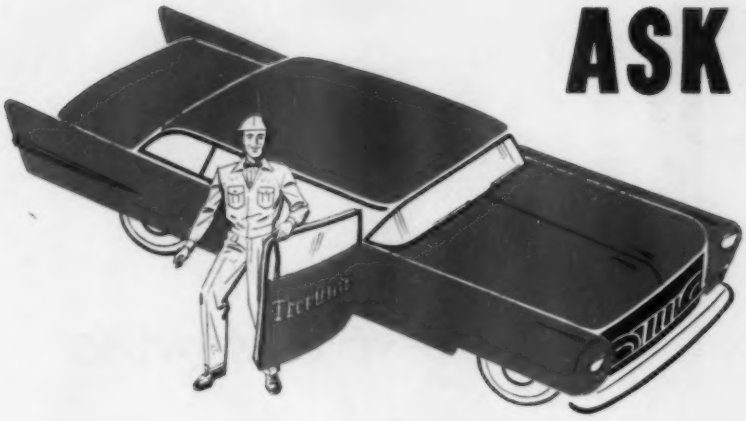


To meet your needs for oil country tubular goods, Republic has tripled Casing and Tubing production in the last ten years. Seamless and welded. H-40, J-55, N-80. Certified to meet all API requirements. On-schedule delivery from strategically located field stocks. Specify "Republic". For more information, write Dept. OG-6316, 1441 Republic Building, Cleveland 1, Ohio.

REPUBLIC STEEL

REPUBLIC STEEL

CLEVELAND, OHIO



ASK THE MAN IN THE RED CAR

for fast, effective answers to your emulsion, corrosion, scale and similar treating problems

Whenever or wherever you see the Tretolite "Man in the Red Car" you are looking at an assistant for many of your field problems.

Not only is the Tretolite Field Engineer strategically located for your quick availability—he is adequately trained and equipped to recognize and effectively cope with most of your treating problems *right then and there!* His rear-of-car laboratory makes it possible for him to render on-the-spot analyses and suggested solutions for your treating problems.

Further, he is an important link in a well-forged, nationwide chain of men and facilities. He knows that he, in turn, is backed by the extensive research and technical experience of the Tretolite Company—always ready to advise, develop, or even send technical men into the field when necessary.

Why not present your very next field problem to
THE MAN IN THE RED CAR!

Chemicals and Services for the Petroleum Industry

DEMULSIFICATION • DESALTING • CORROSION INHIBITING
PARAFFIN REMOVAL • SCALE PREVENTION
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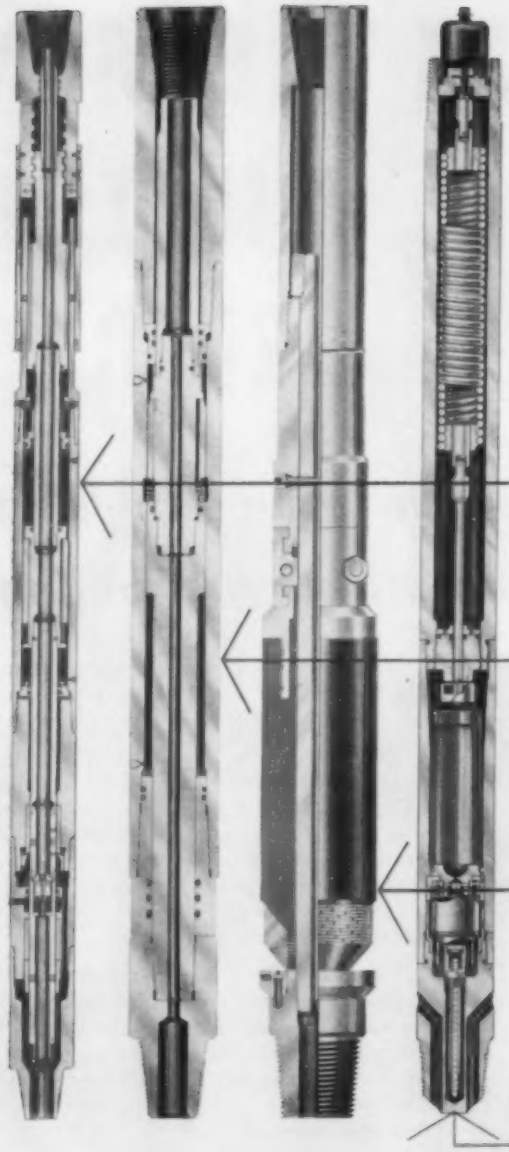


the tool the test designed

The Johnston Shut-In Hydraulic Tester. Designed for positive operation under a wide range of testing conditions. One-piece construction means quicker "make-up" and "break-down" saving valuable rig time.

The newest Johnston Jar, the Type HS-1 Hydraulic Jar, answered the needs dictated by drill stem testing operations. More jarring action from this "easy to maintain" tool. Shorter for "easier handling" and faster "make-up." Designed to consistently deliver and withstand innumerable shocking blows.

The Johnston Bob-Tail Packer. Its design features a reduction of the necessary rubber diameter while assuring a completely effective seal. The increased by-pass area improves running characteristics and speeds up running and pulling time. In washed-out or out-of-gauge holes a larger packer and packing element gives the same advantages.

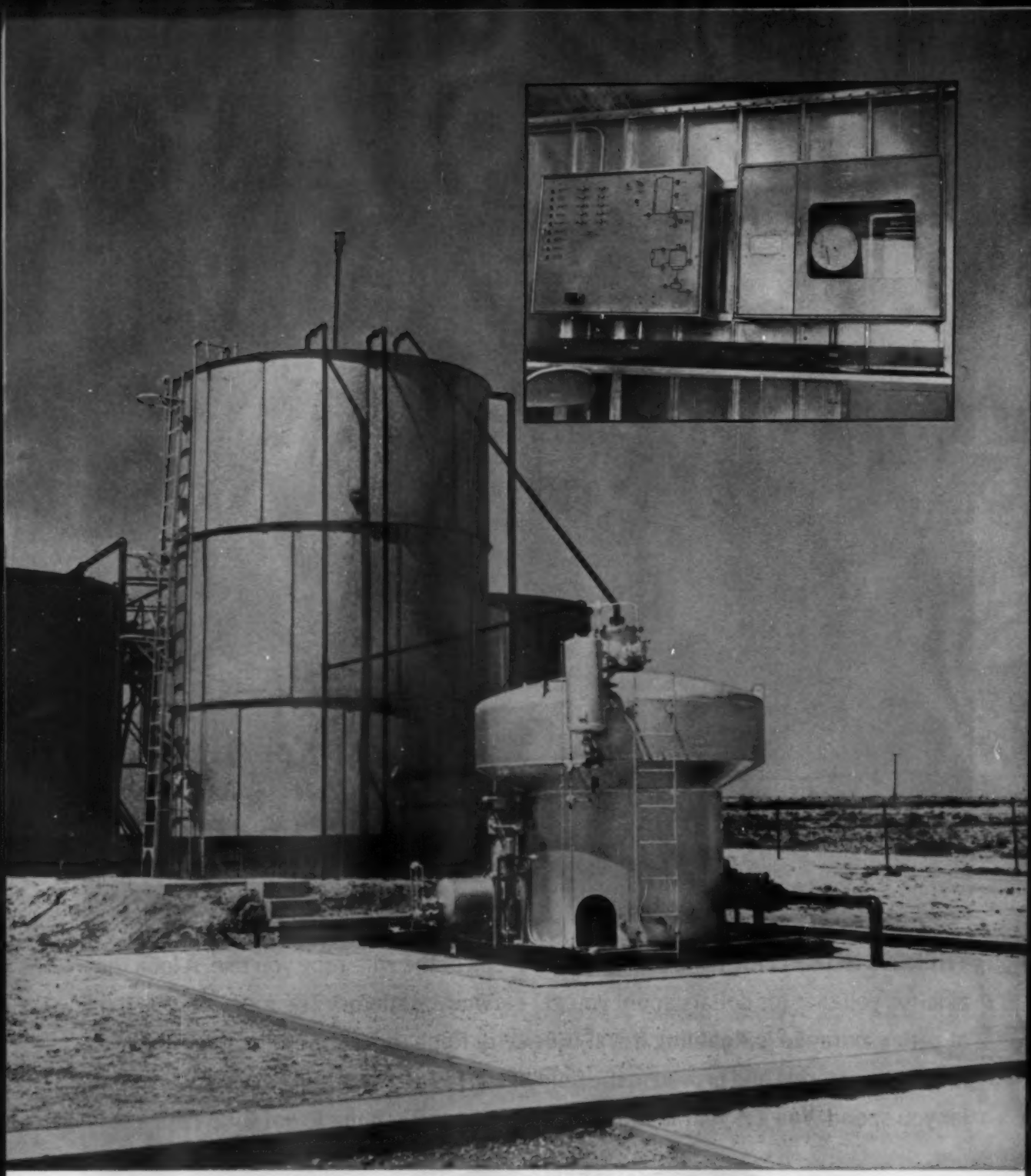
Johnston Type "T" Pressure Recorder. Unfailing accuracy, sensitivity and dependability under all types of formation testing conditions. Extensive laboratory and field tests proved the Johnston Tension Type recorder to be more accurate and dependable, consistently, under all conditions.

Johnston's thirty years of manufacturing and testing know-how is easily recognized in The Tool The Test Designed. Each piece of Johnston equipment is designed to meet the requirements of the test under all types of well conditions.

Rely on Johnston for all your drill stem test needs always. Johnston Testers, Inc., Houston, Texas; Long Beach, California; Calgary, Alberta, Canada. Export Sales Office, Houston, Texas.

A WORLD OF EXPERIENCE

JOHNSTON TESTERS



HERE IS AUTOMATIC CUSTODY TRANSFER AT WORK

This BS&B PHANTO-GAGER unit, installed as a part of a major automated pressure-maintenance program in west Texas, will automatically meter and transfer some 3,500 bbls. of oil per day directly into the pipeline serving the site. Your BS&B Man will gladly provide you with detailed information on today's leading line of lease automation equipment.

BLACK, SIVALLS & BRYSON, INC., DEPT. 1-A12 P. O. BOX 1714, OKLAHOMA CITY

THERE IS NO BETTER TIME to take a close look at the wire rope you use. A look that assures you that for dollars spent you get **services rendered.** The rope you can look at with assurance is **Roebling Royal Blue Wire Rope.** It has been thoroughly tested in our laboratories and proved in the field. It will repay you in hard work for every dollar you spend. **You get your money's worth.** You get **Roebling Royal Blue Wire Rope.**

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Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

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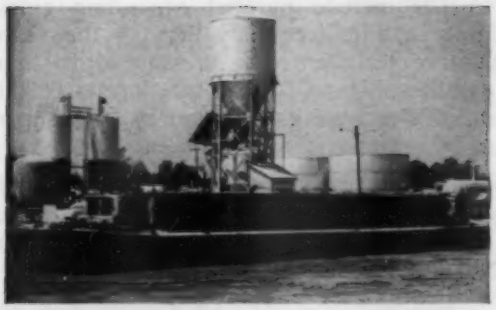
ROYAL·1105·BLUE
DESIGN
FOR WIRE ROPE
Its ready adaptability is evident wherever power is transmitted. It conforms to unique design requirements. Use wire rope to transmit power.

WE HELP ALL KINDS OF OIL MEN



The men who supply the rig, the men who service it, the men who keep it running are all oil men. They are all in the same business, and they are all a necessary part of it. The Oil and Gas Department at The National Bank of Commerce of Houston has the experience and the know-how to help each kind of oil man.

The Commerce can help you because it knows what it's talking about, and, even more important from your point of view, it knows what *you're* talking about. If you are planning to drill, if you are planning to extend needed services, if you are in the oil business, you'll find that The National Bank of Commerce will help you all the way.

E. O. Buck, *senior vice president, Oil and Gas Department.*

THE NATIONAL BANK OF

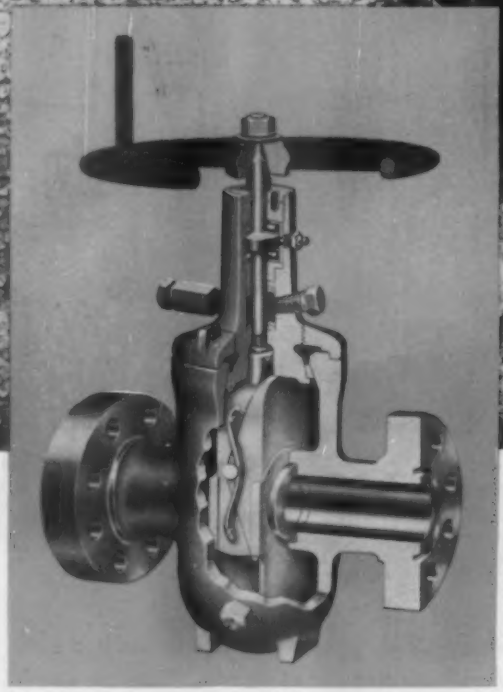
COMMERCE

OF HOUSTON

GULF BUILDING • MAIN AT RUSK • HOUSTON

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Facilities of the Oil and Gas Department of The National Bank of Commerce of Houston are available in Wyoming, Nebraska, Colorado, New Mexico, Louisiana, Mississippi, and Texas.



Practical advantage of W-K-M's *Creative Engineering*:

On-the-line overhaul!

Fast, easy overhaul of W-K-M Gate Valves while on the line saves you time and money and contributes to the overall efficient performance and long-range economy that W-K-M valves are noted for.

Other benefits include parallel expanding gates, controlled force seating, free flow through the valve without any more turbulence or pressure drop than through a smooth-wall pipe, Teflon seat inserts (in all valves up to 5,000 psi working pressure), and superfinished stems.

Available in standard types, balanced stem*, recessed body, dual and triple completion types. Sizes range from 1½" through 7" for pressures ranging from 500 to 15,000 psi working pressure.

* *Illustrated above right*

Completely dependable

The superior performance of W-K-M production valves is attested by the experience of users.

These valves have earned a reputation that inspires confidence throughout the world. Field men recommend them; engineers specify their use.

W-K-M valves set industry standards for design . . . reliability . . . easy operation . . . and long-range economy.

On hand at your supply store

The most used sizes of W-K-M gate valves are carried by supply stores everywhere. Special sizes and special designs are produced as you need them.

WRITE FOR CATALOG 200
which describes W-K-M Through-Conduit Gate Valves for oilfield services.

W-K-M

DIVISION OF ACF INDUSTRIES
INCORPORATED
P. O. BOX 2117, HOUSTON, TEXAS
Export Office: 45 ROCKEFELLER PLAZA, NEW YORK, N. Y.

5819

PROOF OF DEPENDABILITY

Cutler-Hammer Control sets new performance records at West Virginia Pulp & Paper Company

In the West Virginia Pulp & Paper Co. plant mechanized for the high volume production of multi-wall paper bags, the plant electrician has reported, "About two years ago we installed a Cutler-Hammer Reversing Starter on one of our bag machines and we thought you might be interested in our experience with this control.

"Because of the nature of the operation, the motor averages 48 reversals per minute. During the past two years this starter has operated with complete satisfaction . . . and is still operating satisfactorily. But more important the control hasn't required any time or attention . . . no production time lost because of a control failure. And this is a record with us because the best service we could get from other controls used was about 2½ months before failure during which time the control required frequent repairs to keep it in operation."

This is positive proof of dependability . . . proof that Cutler-Hammer Three-Star Motor Control works better, lasts longer than any other on the market today. Why take chances with production interruptions? Order dependable Cutler-Hammer Three-Star Motor Control from your nearby Authorized Cutler-Hammer Distributor today. For complete ordering information write for the Cutler-Hammer Merchandiser Pub. EA-100-Y-275.

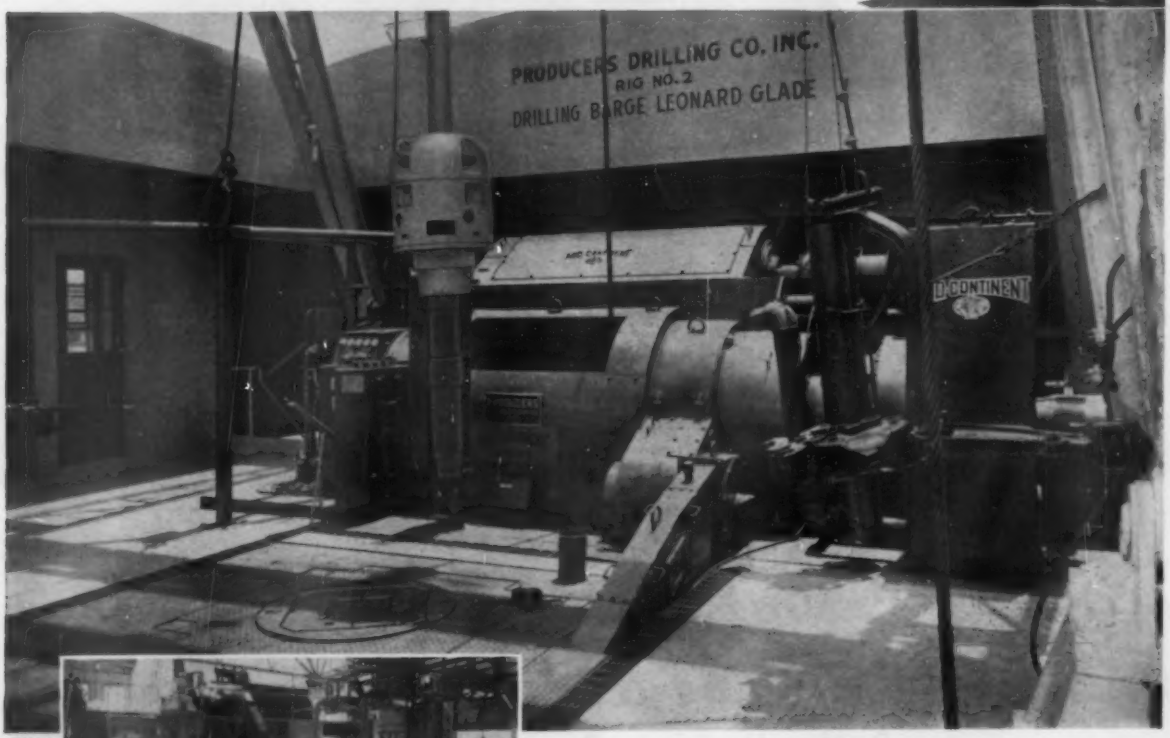
Cutler-Hammer Inc., Milwaukee 1, Wisconsin.

CUTLER·HAMMER

Cutler-Hammer Inc., Milwaukee, Wis. *Division:* **Airborne Instruments Laboratory.** *Foreign:* **Cutler-Hammer International, C. A.**

Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.; Intercontinental Electronics Corporation, Inc.

MID-CONTINENT U-914 DRAWWORKS SELECTED FOR "LEONARD GLADE"



DW4-8

Mid-Continent S-612-A Swinging Compound* on the *Leonard Glade*.

Main slush pumps on the *Leonard Glade* are an Emsco D-1000 and D-700.

Producers Drilling Co., Inc. of New Orleans has selected Mid-Continent's 1400 horsepower U-914 drawworks for their recently-completed drilling barge *Leonard Glade*. This is the second barge-mounted rig completely equipped by Mid-Continent for Producers. The first barge, the *W. F. Youngblood*, was launched in 1957.

Major items of drilling equipment provided by Mid-Continent for the *Leonard Glade* include the drawworks, a Mid-Continent S-27½-A rotary table, a Mid-Continent S-612-A Swinging Compound* rig drive, Emsco D-1000 and D-700 slush pumps, a 14" unitized mud-mixing pump, and a Lee C. Moore cantilever-type mast.

For information about any item of drilling equipment or machinery, contact your Mid-Continent representative.

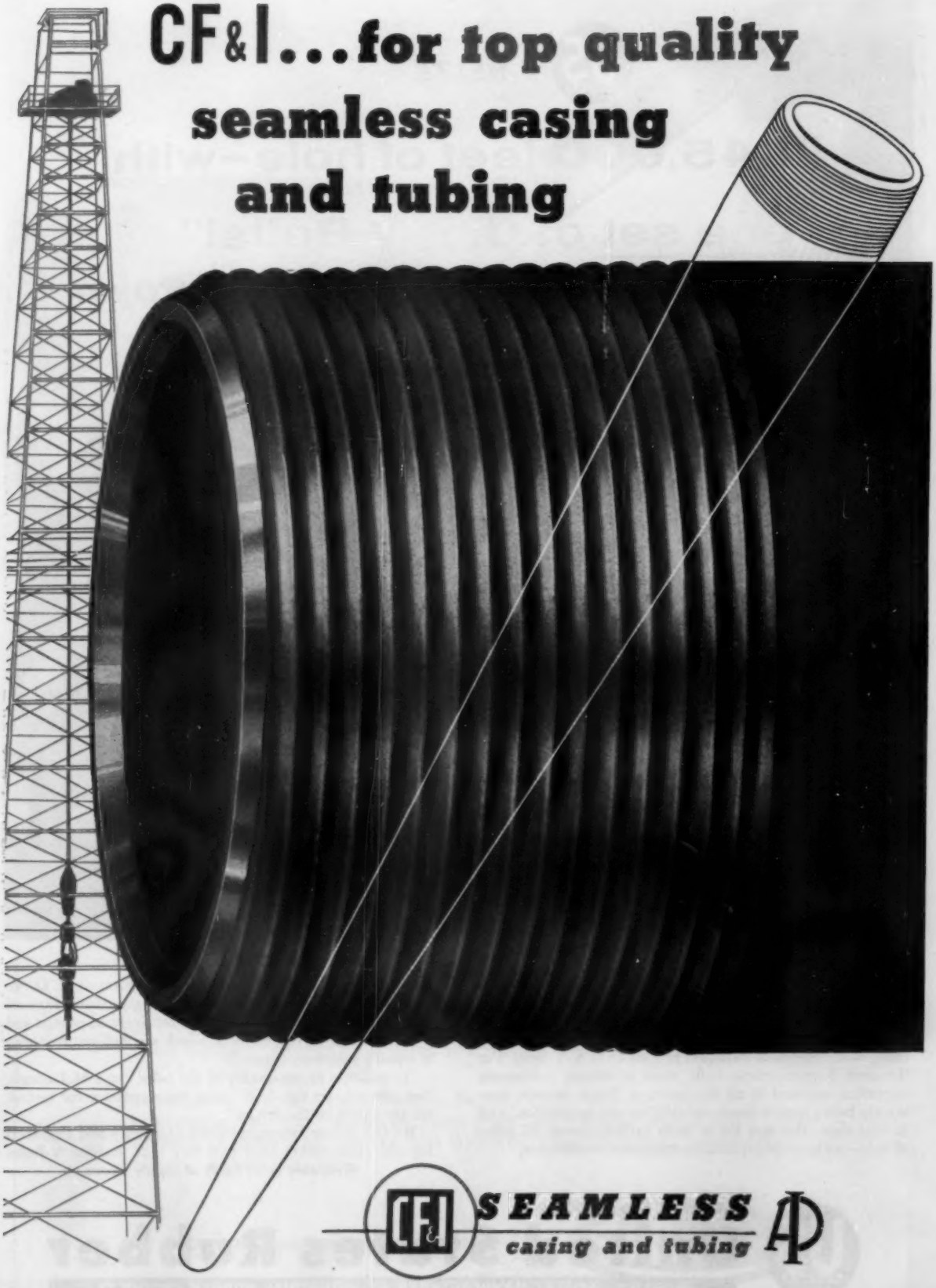
* PATENTED

MID-CONTINENT SUPPLY CO.

MID-CONTINENT BUILDING • FORT WORTH, TEXAS
Export Division: 45 Rockefeller Plaza, New York 20, N. Y. Cable: MIDCUMPORT NYK

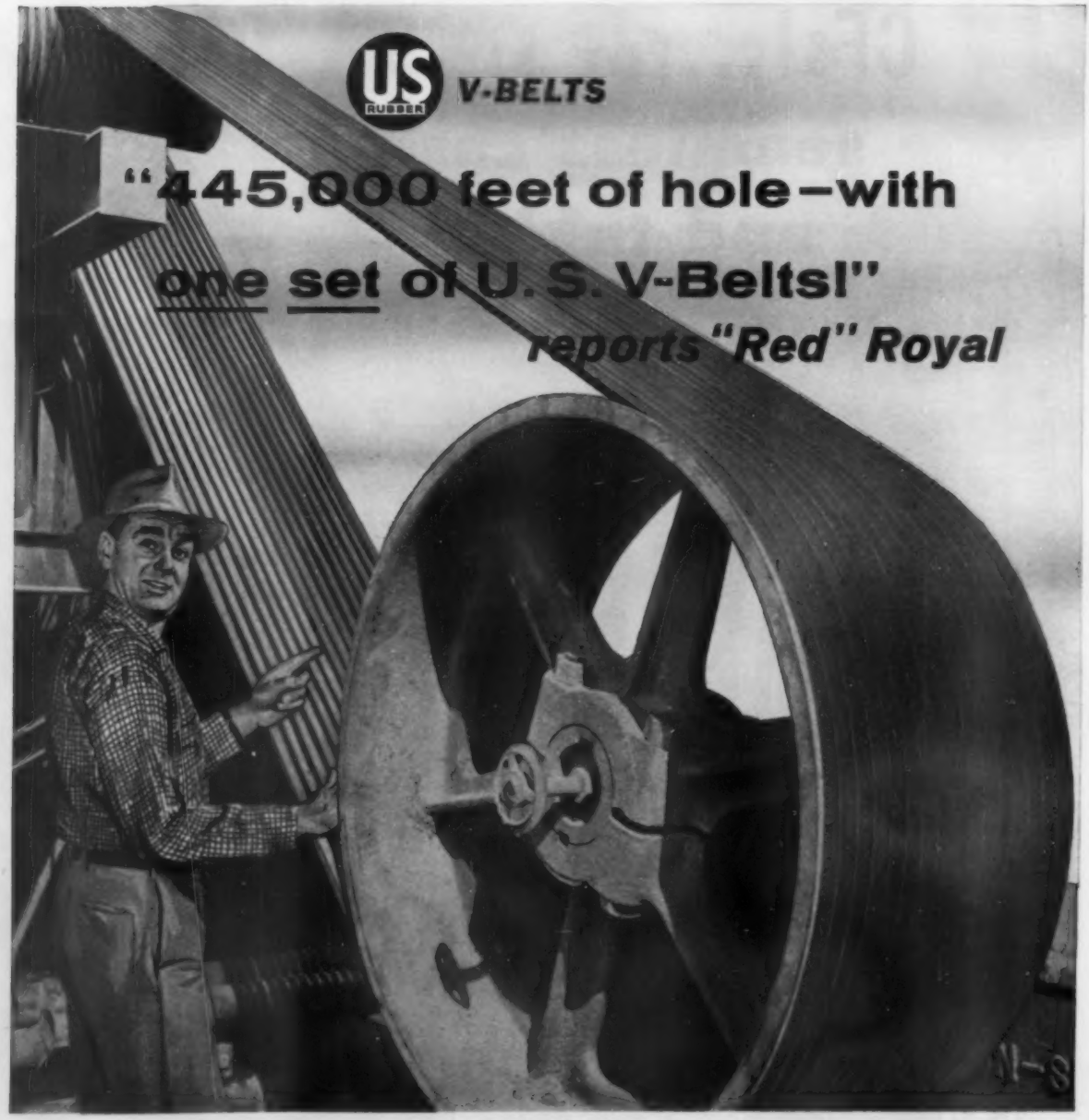
THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

CF&I...for top quality seamless casing and tubing



SEAMLESS
casing and tubing

THE COLORADO FUEL AND IRON CORPORATION • DENVER, COLORADO



Talk about getting V-Belt drilling mileage! That's what "Red" Royal's friends — toolpusher Mac Cavasar and his crew — got on their Holmes Drilling Co. rig.

Back in 1951, not satisfied with the brand of belts being used, Mac's company switched to a set of U. S. V-Belts. For the next 5 years, these belts were in almost continuous operation, exposed to all the rigors of Texas climate, constantly being moved from one drilling site to another. And in that time, this one set of belts drilled almost 85 miles of hole—without any special maintenance whatsoever.

Naturally, Mac and drilling superintendent O. R. McLamore are very satisfied with the performance of U. S. V-Belts. They're using them extensively on pumps and several smaller drives, many of which are well on their way to equally impressive records.

"In addition to the quality of the belts," says McLamore, "we also rely on the 'U.S.' sales representative for technical assistance on the drives."

It's this 2-way assurance—product quality and engineering aid—that makes your best buy U. S. Rubber V-Belts.

Available in all fields at supply stores.

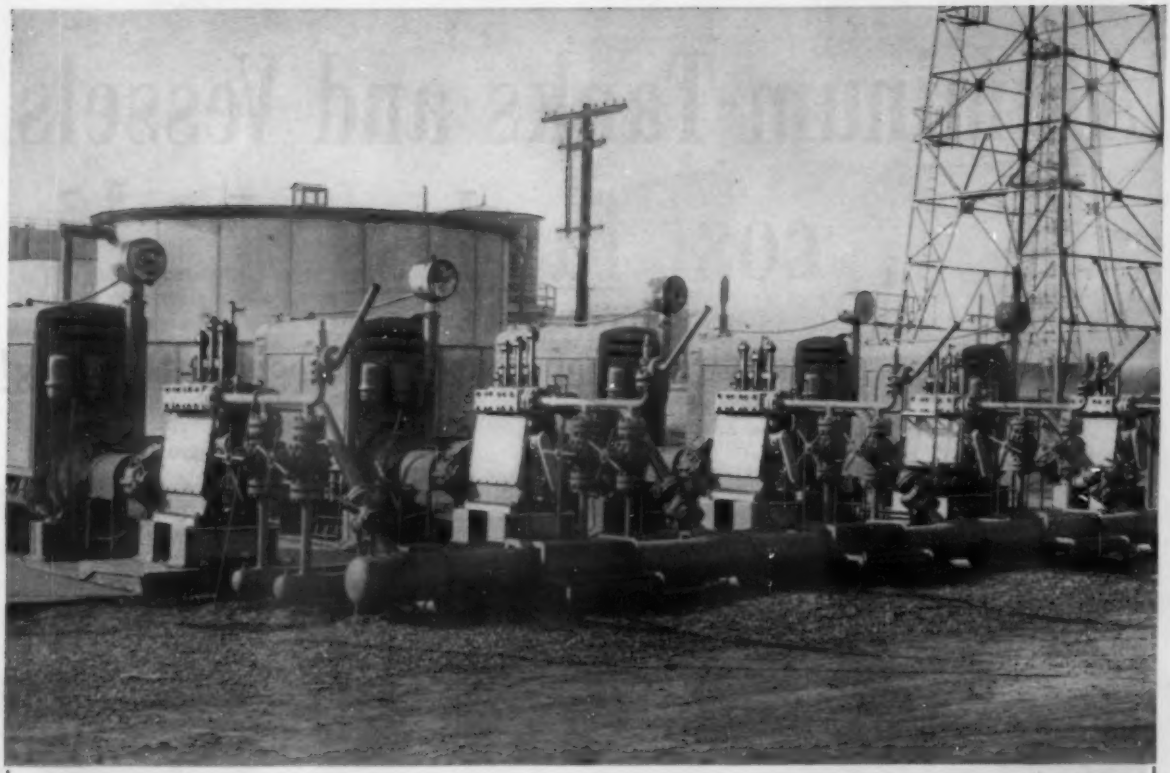
US RUBBER

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.



FIELD REPORT

FLOOD: Hellman-Reyes
Dominguez First East Central

OPERATOR: Union Oil Company of California

PUMPS: Five Aldrich Triplex

FLOODING STARTED: July, 1954

EXPERIENCE TO DATE:

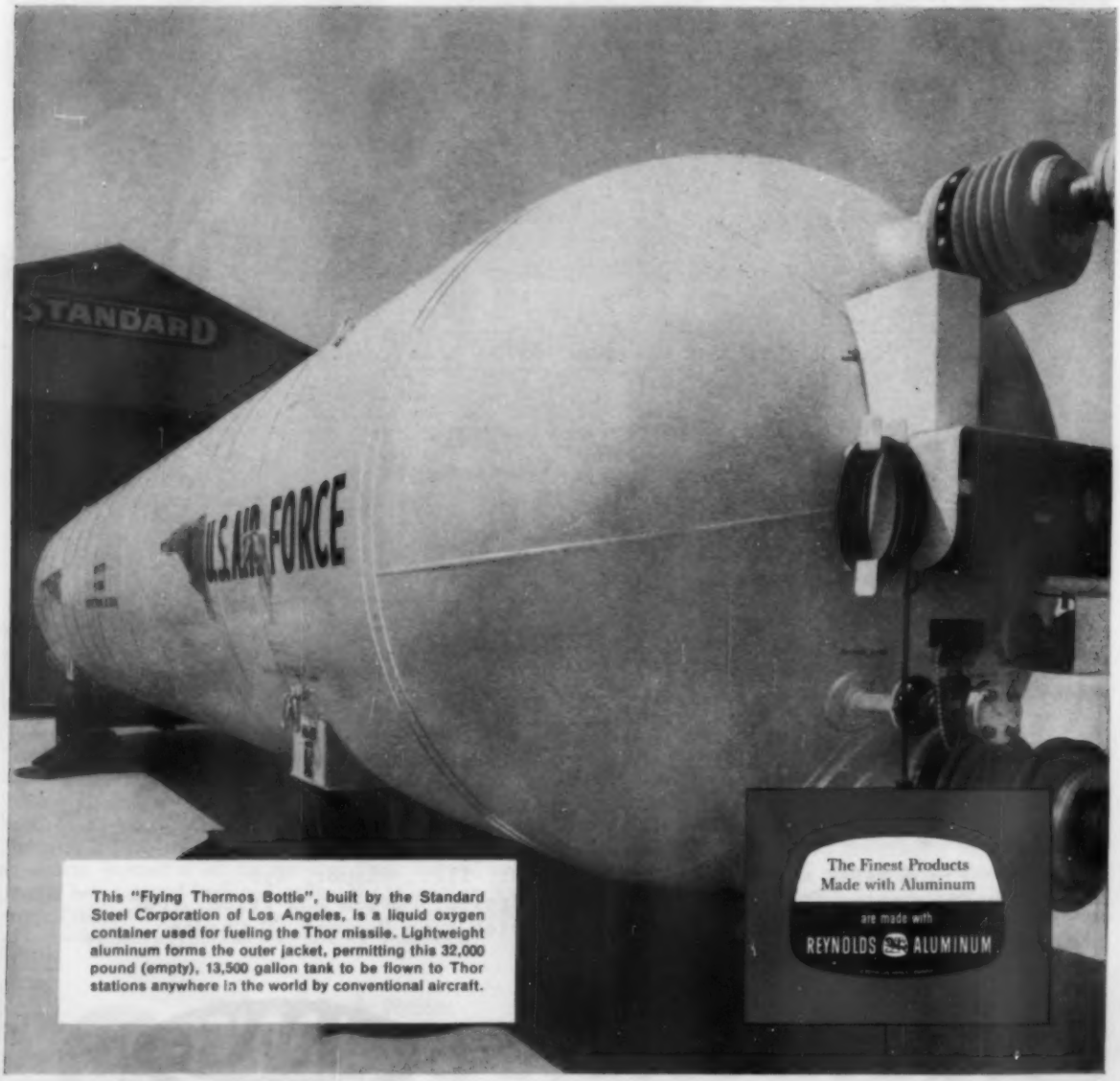
Pumps are in continuous service, delivering 10,000 B/D at 1300 psi. Customer reports: "No mechanical breakdowns of any type on these pumps...plunger packing and valve discs replaced only once to date."

Field parts stock available in Carmi, Ill.; Casper, Wyo.; Charleston, W. Va.; Houston; Los Angeles; Odessa and Tulsa. For further information, write the Aldrich Pump Company, 9 Gordon Street, Allentown, Pa.

the toughest pumping problems go to ALDRICH

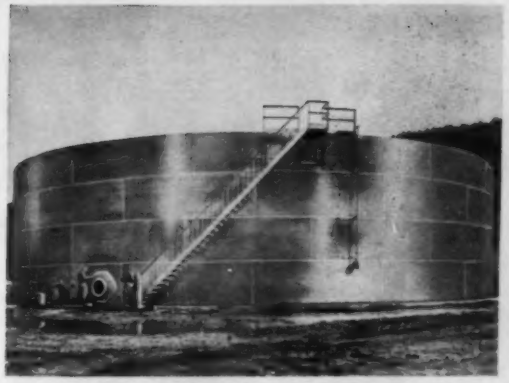
Aluminum Tanks and Vessels cost far less

...than those made with other corrosion-resistant metals!

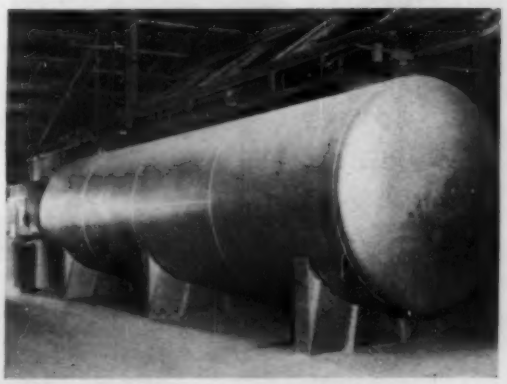


This "Flying Thermos Bottle", built by the Standard Steel Corporation of Los Angeles, is a liquid oxygen container used for fueling the Thor missile. Lightweight aluminum forms the outer jacket, permitting this 32,000 pound (empty), 13,500 gallon tank to be flown to Thor stations anywhere in the world by conventional aircraft.

The major costs of tanks or vessels are for initial materials and subsequent maintenance—and aluminum is the one corrosion-resistant alloy that offers big savings in both. It will not rust. It is corrosion-resistant in most atmospheres. And, it's easy to keep clean. Yes, aluminum costs less, far less, and here are more reasons why:



This giant aluminum tank holds ammonium nitrate solution. Non-sparking aluminum gives extra-long service under constant exposure to corrosion, with a minimum of maintenance.



Highly corrosive nitrogen solutions are safely stored in this tank made of Reynolds Aluminum for quick, local service to farmers for use in soil treatment.

CORROSION-RESISTANT

Aluminum resists corrosion from most process liquids. *Hydrogen peroxide, petroleum products, acetic acids, nitric acids, nitrogen solutions, turpentines, lacquers, beverages, sulphur-bearing gases*—all, and many other corrosives, can be handled in aluminum tanks and vessels without contamination or corrosion. Climatic conditions and atmospheric gases normally do not affect aluminum. Flammables may be safely stored in aluminum tanks and vessels, for aluminum is non-sparking.

LIGHTWEIGHT

Aluminum weighs just one third as much as steel. This means *one* man can often do the fabricating work of three. This is an important cost reduction, from the initial purchase through handling, shipping and fabrication, to final installation.

EASY TO FABRICATE

Tanks and vessels require high quality welding . . . and aluminum is an exceptionally easy-to-weld material. In fact, welds of comparable strengths can be made five to eight times faster on aluminum than on most other metals! Brazing equally well, it is also one of the most formable, most economical metals to work with.

EXCELLENT THERMAL CHARACTERISTICS

Reflecting up to 95% of radiant heat, aluminum provides superior protection for volatile chemicals. And aluminum's high thermal conductivity speeds the transfer of heat.

LOW TEMPERATURE PROPERTIES

Aluminum, due to its excellent mechanical properties and low cost, is the ideal material for handling low temperature liquids such as *liquefied oxygen, nitrogen, methane,* etc.

IN USE EVERYWHERE

Aluminum is finding wider and wider use in the processing industry because no other metal offers so many benefits at such large savings. To learn how Reynolds Aluminum can help you, or for technical service, call your local Reynolds office or write *Reynolds Metals Company, Box 2346-CR, Richmond 18, Virginia.*

Write today for Reynolds Free Brochure on Aluminum Tanks and Vessels

REYNOLDS ALUMINUM

RICHMOND 18, VIRGINIA

Watch Reynolds new TV shows—**"WALT DISNEY PRESENTS"** and **"ALL-STAR GOLF"**—every week on **ABC-TV.**

• *In the oil world Houston is* **FIRST CITY**

• *With oil men Houston's* **FIRST CITY** *National is first*

• Make friends now at the oil man's bank—
where you'll find officers with a practical
knowledge of your requirements.

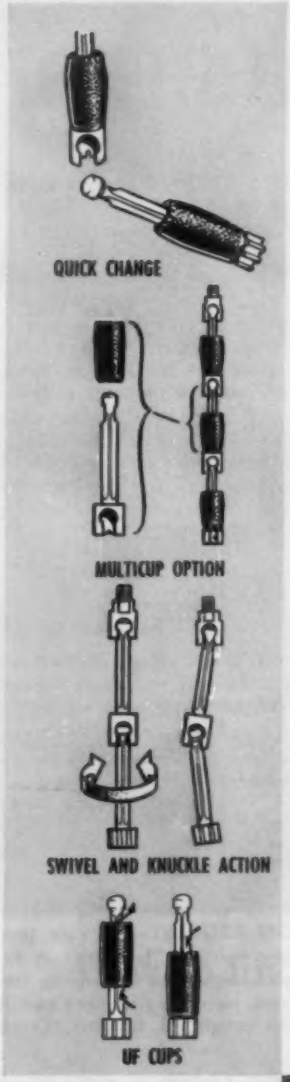
FIRST CITY
NATIONAL BANK OF HOUSTON

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

CUT COSTS..SPEED-UP SWABBING with NEW

GUIBERSON Knuckle Joint Tubing Swab

and SENSATIONAL MULTI-PURPOSE UF CUPS



QUICK CHANGE — New ball-and-socket design, another Guiberson first, lets you change cups in *ten seconds* with the swab hanging on the line . . you don't even have to lay the swab and sinker bars down. No pipe wrenches or other tools are required. This one feature reduces cost tremendously . . but that's not all . .

MULTICUP OPTION — Add a cup and upper mandrel . . as many as desired. No need to carry several different swabs . . no time lost in changing swabs. There are only five parts in a two cup swab . . sub, cups, upper and lower mandrels. Heat-treated steel parts are individually tested to withstand heaviest swabbing loads.

SWIVEL AND KNUCKLE ACTION—You get full 360° swivel at the bottom socket joint and 5° knuckle action at every joint. With any number of cups and even in crooked tubing, the combination of knuckle action and ample bypass makes this the fastest-falling swab ever run.

UF CUPS — Are strong, flexible, long life . . made from special compound with a valve ring molded in the base. Thus, new valves are obtained each time the swab is redressed. Cups travel freely on the mandrel, allowing bypass inside and outside the cup in the up position . . sealing perfectly in down position. The UF cups, designed especially for the knuckle joint swab, are strongly reinforced for heavy loads . . flexible enough for light loads . . small enough for tight tubing. Use the knuckle joint swab with UF cups and lift more fluid in fewer trips.

SAVE MONEY ON YOUR NEXT JOB WITH THIS SWAB

Sold by OIL FIELD SUPPLY STORES EVERYWHERE

THE

GUIBERSON

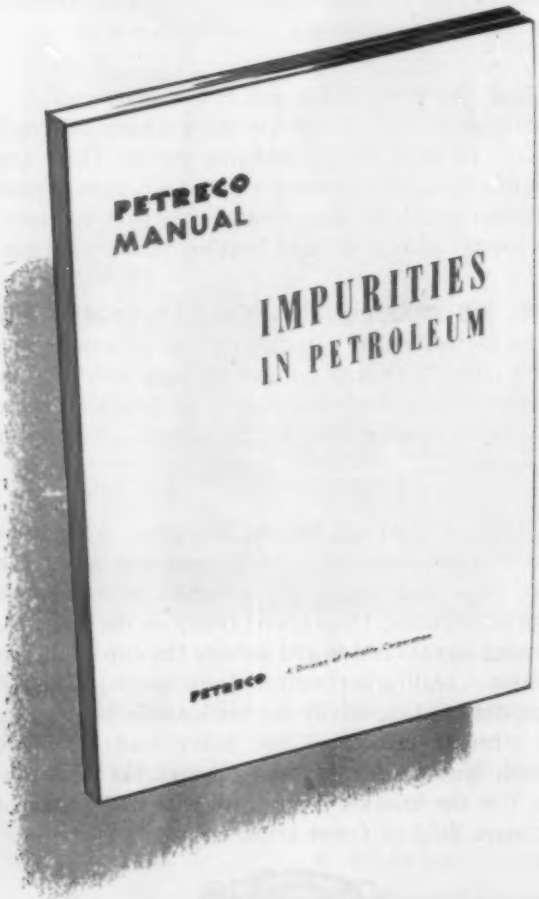
CORPORATION

ESTABLISHED 1919

DALLAS, TEXAS U. S. A.

valuable information
for REFINERY EXECUTIVES,
PROCESS and RESEARCH ENGINEERS,
LABORATORY SUPERVISORS
and others interested
in the problems growing out of

"IMPURITIES IN PETROLEUM"



THIS TECHNICAL MANUAL is an up-to-date summary of impurities commonly found in petroleum and its products, especially as related to their significance in refinery operations. It contains the results of Petreco's extensive research on the subject, as well as the latest contributions from others in the industry. Part I describes how these impurities are affecting refinery operations where new processes, especially of the catalytic variety, have in recent times tended to disproportionately increase their harmful effects. The growing demands to produce maximum yields and premium products make this topic an increasingly important one. Part II presents a series of selected and tested analytical methods applicable to the evaluation of processes designed for the removal of these impurities.

Here are just some of the topics discussed in this informative new edition:

PARTIAL TABLE OF CONTENTS

THE NATURE OF PETROLEUM IMPURITIES • *Oleophobic impurities* • *Oleophilic impurities* • *Impurity residues from chemical treatments.*

SELECTED ANALYTICAL METHODS • *Sampling* • *Water Contents of Oils* • *Carry-over from Chemical Treatments* • *Salts in Crude Oils* • *Direct Determination of Chlorides* • *Phenols, Thiophenols, Mercaptans, Sodium and Free Sulfur in Distillates* • *Fouling Test for Settled Alkylates* • *Water Reaction Test for Aviation Fuels, etc., etc.*

THIS INFORMATIVE MANUAL IS YOURS ON REQUEST—For your personal copy of the newly-revised "Impurities in Petroleum", address your request to Petreco on your company letterhead, including your name and title.

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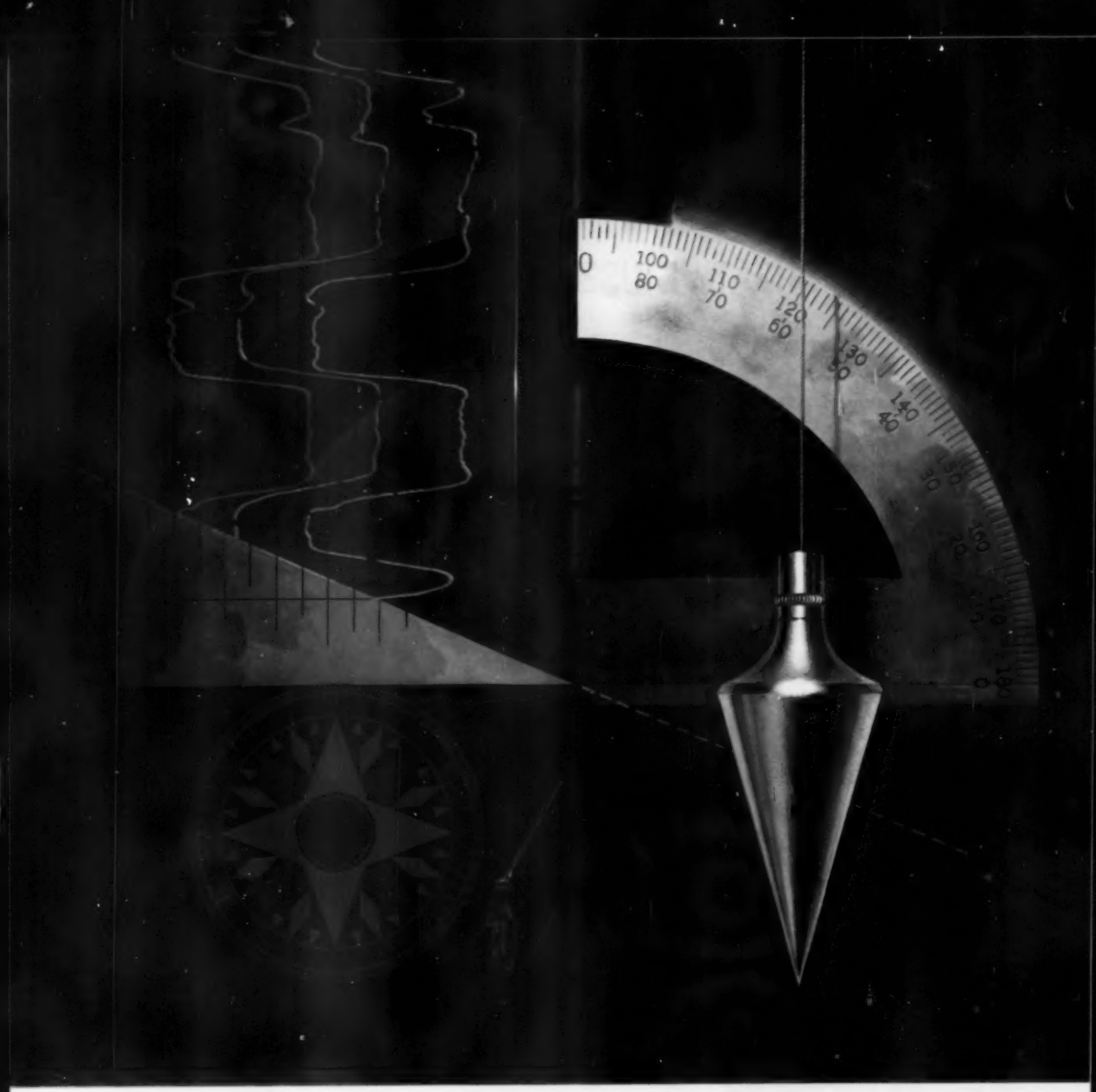

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NEW DESIGNS IN CATERPILLAR EQUIPMENT AND PARTS DEPEND ON CREATIVE USE OF HIGHEST QUALITY STEEL

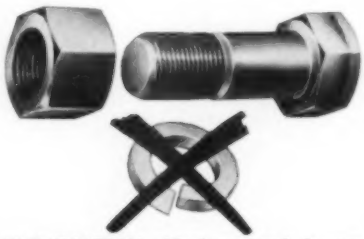
Example: Track hardware, made of stronger pre-tested steel and "Hi-Electro" hardened, stays tight without lock washers, often lasts through two sets of shoes

How much does it cost to pull a tractor off a job to tighten or replace track hardware? It costs plenty, in down time and in service time. That's why Caterpillar's new track hardware is such a good investment.

Caterpillar hardware normally stays tight without the use of lock washers throughout the service life of the first set of track shoes. And, exclusive "Hi-Electro" hardening of dome-shaped bolt heads often permits bolts to be used for a second set of shoes.

Most track hardware looks pretty much alike, but there's a big difference in quality. Steel, for instance. All steel for Caterpillar's new track bolts has a minimum tensile strength of 151,000 pounds per square inch, well above the SAE standard of 120,000-140,000.

The special steel accepted for track hardware is furnace-heated, quenched and tempered to toughen the entire bolt against breaking, bending and the permanent stretching that leads to loosening of the nut.



ELIMINATION of lock washer is feature of Caterpillar's new track hardware.

Carbon, lost from the surface area in mill rolling and heat treating, is restored by Caterpillar with a carefully controlled, carbon-atmosphere process. Then threads are "rolled" into the bolt, curving the natural flow lines to follow the thread contours, producing threads that are highly resistant to stripping.

The large dome-shaped head receives an exclusive deep and even "Hi-Electro" hardening. This protects the hexagonal corners from mushrooming. Wrenches fit onto Cat bolts after many hundreds of hours of hard use.

This same quality of material, design and manufacture is found in *all* Caterpillar parts. And they're always available at your Caterpillar Dealer. See him today.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

SERVICE TIP

A torque wrench should always be used to tighten track hardware to factory-recommended torque values. Your Operating and Maintenance Instructions give exact values for each tractor model.

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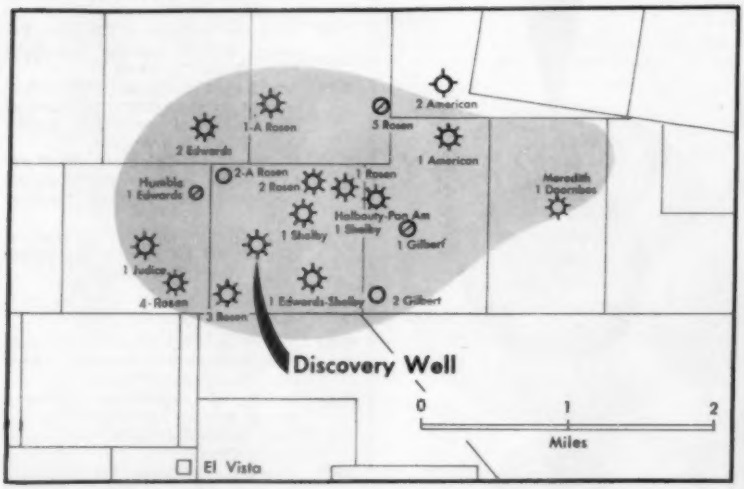
DON KOPP, Master Mechanic, McCann & Co., Inc., Springfield, Ill.: "We're real boosters of genuine Cat parts, especially track parts. Other brands just don't last as long. When you buy Cat parts you know they are going to fit, last longer and give the best service because they are built to do the job by the people who built the machines."

They Say—

Port Acres map incorrect

Dear Sir:

I feel that when I read an article that I am quite familiar with and find errors in said article that I should bring such to your attention.



The article is the Port Acres story on page 140 of the November 17 issue.

The No. 4 Rosen is located incorrectly. It should be offsetting the Peter Henderson No. 1 Judice on the southeast of the Judice well.

The Ward well is incorrectly located. It should be northwest of the Judice.

Ownership of the wells is incorrect. Halbouty operates the 1-A Rosen without Pan American as a partner. Peter Henderson and H. Curtis Plumly are the operators of the Judice.

G. P. Cokinos
Railroad Commission of Texas
Oil and Gas Division
Houston.

(Editor's note: We used incorrect locations listed in a commercial scouting service. Thanks to sharp-eyed readers Combs and Cokinos, we're back on the beam. See corrected Port Acres above.)

Map the work of Batchelder?

Dear Sir:

Max Batchelder must have prepared the Port Acres field map appearing in your November 17 issue while Lynn Nichols (Journally Speaking, Nov. 17, p. 109) was on vacation since a number of the locations are not accurate.

Apologies to Batchelder!

T. Combs
Combs & Co.
Beaumont, Tex.

Missing from the list

Dear Sir:

In the exploration section of your special economic report in the November 10 issue (p. 109), your list of possible exploration tools for the future was most interesting.

Radioactivity surveying was quite conspicuous by its absence. Since this technique was removed from the realm of "witchers" and unscrupulous promoters and given sound scientific scrutiny and development, it has been high on the list of promising exploration tools. The successful use of the method is spreading rapidly.

William D. Crews
Exploration Research
Cities Service Research & Development Co.
Tulsa.

(Editor's note: Certainly radioactivity surveying is now an accepted technique and is in wide use. Emphasis in the November 10 article was placed on methods just on or not yet over the horizon.)

Letters to They Say should be addressed to The Editor, The Oil and Gas Journal, Box 1260, Tulsa, Okla.

OIL WELL BLOWOUT That Did Not Happen

Pressure — thousands of pounds per square inch — is released like a giant missile in reverse, then in a fraction of a second, it is shut off. Stresses are unbelievably high, but control is established instantly. Here in Cameron's test area, actual oilfield conditions are duplicated. New equipment is shock tested beyond normal working limits to prove a point in design. These tests and innumerable others like them have been part of Cameron's continuing design development program. Just such dedication to advancement has put Cameron in the position of world leader in pressure controls for oil well drilling and production. This is why, if oil is your interest, you can COUNT ON CAMERON for the most reliable, most economical protection in any producing area.

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HYCALOG

Some actual cases:

CONTINUING RESEARCH FOR LOWER COST DRILLING

BIT #1408, 6 9/16" O.D.

Averaged 5.7 ft./hr. from 9,700 to TD of 12,350 in Duval County, Texas. Then it was run in a second well in Kenedy County from 10,006 to 10,759 at an average of 3.4 ft./hr. This one bit racked up a total 3,403 feet of hole through sand and shale.

BIT #1457, 6 1/16" O.D.

Averaged 4.1 ft./hr. through 1,328 feet of Miocene in Acadia Parish, Louisiana. Drilling in the first 500 feet was limited by operator to 6 ft./hr. due to hole condition, but the bit could have made 15 ft./hr. And it was good for lots more hole after reaching TD of 14,100.

BIT #1469, 5 23/32" O.D.

Averaged 2.8 ft./hr. from 16,603 to 17,500 in Jeff Davis Parish, Louisiana. Replaced an estimated 25 rock bits for which the trip time alone would have cost about $17,500. Other drilling costs were reduced proportionately because of the time saved.

These are the records of three bits in wells recently completed. And they're typical. We've picked them to show the exceptional economy of drilling with our V-Door bits in the Gulf area.

Your Hycalog representative has a stack of similar outstanding records made in the Gulf and other areas. Ask to see them. But, better yet, try a Hycalog V-Door bit on your next drilling program.

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CALENDER

NOVEMBER

30-Dec. 5 American Society of Mechanical Engineers, annual meeting, Statler and Sheraton-McAlpin hotels, New York.

DECEMBER

1-2 Kansas Independent Oil and Gas Association, twenty-first annual meeting, Broadview Hotel, Wichita.

1-3 Interstate Oil Compact Commission, annual meeting, Kansas City.

2-4 Asphalt Institute, annual membership meeting, Shoreham Hotel, Washington.

7-10 American Institute of Chemical Engineers, annual meeting, Netherland Plaza Hotel, Cincinnati.

8-10 American Management Association, seminar on management problems of exploration and production, Ambassador Hotel, Los Angeles.

9-10 University of Oklahoma, third annual course in water-quality control for subsurface injection, Norman, Okla.

11-12 Mid-Continent Oil and Gas Association, annual ad valorem tax forum, Hilton Hotel, Fort Worth.

JANUARY

12-14 Pipe Line Contractors Association, eleventh annual convention, Americana Hotel, Miami Beach, Fla.

12-16 Society of Automotive Engineers, annual meeting and engineering display, Sheraton-Cadillac and Statler hotels, Detroit.

16-17 Association of Oilwell Servicing Contractors, annual meeting, Baker Hotel, Dallas.

22-24 Texas Society of Professional Engineers, annual convention, Shamrock Hilton Hotel, Houston.

23 Natural Gasoline Association of America, Oklahoma regional meeting, Biltmore Hotel, Oklahoma City.

26-29 Tenth annual plant maintenance and engineering conference, sponsored by Clapp & Poliak, Inc., Public Auditorium, Cleveland.

28-29 Annual Midwest Welding conference, sponsored by Armour Research Foundation of Illinois Institute of Technology, and American Welding Society, Chicago section, Illinois Institute of Technology, Chicago.

30-31 Oklahoma Society of Professional Engineers, annual meeting, Mayo Hotel, Tulsa.

FEBRUARY

1-6 American Society for Testing Materials, D-2 committee on petroleum products and lubricants, Sheraton-Jefferson Hotel, St. Louis.

2-27 Southwestern Legal Foundation, short course on oil and gas law, Southwestern Legal Center, Dallas.

9-11 American Association of Petroleum Geologists, Rocky Mountain section, ninth annual meeting, Civic Auditorium, Albuquerque, N. M.

11-13 Southwestern Legal Foundation, tenth annual institute on the law of oil, gas, and taxation, Southwestern Legal Center, Dallas.

11-13 National Association of Corrosion Engineers, Tulsa section, tenth annual pipeline corrosion short course, Mayo Hotel, Tulsa.

16-18 American Management Association, seminar on management problems of

exploration and production, Hotel Astor, New York.

15-19 American Institute of Mining, Metallurgical, and Petroleum Engineers, annual meeting, Sir Francis Drake Hotel, San Francisco.

24-25 University of Oklahoma, sixth geological symposium, Norman, Okla.

27 Natural Gasoline Association of America, Permian basin regional meeting, Scharbauer Hotel, Midland, Tex.

26-28 Pipe Line Contractors Association of Canada, fifth annual convention, Castle Harbour Hotel, Bermuda.

MARCH

3 Petroleum Equipment Suppliers Association, Pacific district, annual membership meeting, Ambassador Hotel, Los Angeles.

9-11 Midwest Gas Association, annual meeting, Hotel Fort Des Moines, Des Moines.

11 Petroleum Equipment Suppliers Association, southwestern district, annual membership meeting, Shamrock Hilton Hotel,, Houston.

13 American Institute of Chemical Engineers, Sabine area section; American Chemical Society, Texas-Louisiana Gulf section; sixth annual joint technical meeting, Lamar State College of Technology, Beaumont, Tex.

16-18 Western Petroleum Refiners Association, forty-seventh annual meeting, Hilton Hotel, San Antonio, Tex.

16-18 Society of Automotive Engineers, national passenger car, body, and materials meeting, Sheraton - Cadillac Hotel, Detroit.

18 Petroleum Equipment Suppliers Association, eastern district, annual membership meeting, Duquesne Club, Pittsburgh.

16-19 American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, forty-fourth annual meeting, Memorial Auditorium, Dallas.

19-20 New England Gas Association, annual meeting, Hotel Statler, Boston.

25-27 American Petroleum Institute, Division of Production, southern district meeting, Roosevelt Hotel, New Orleans.

APRIL

2-3 Society of Petroleum Engineers of AIME, Rocky Mountain petroleum section, Casper, Wyo.

2-3 American Institute of Mining, Metallurgical, and Petroleum Engineers, technical conference on stress corrosion, Mellon Institute, Pittsburgh.

6-7 Instrument Society of America, second national symposium on chemical and petroleum instrumentation, St. Louis.

5-10 American Society of Mechanical Engineers, nuclear congress, Cleveland Auditorium, Cleveland.

8-10 American Petroleum Institute, Division of Production, eastern district meeting, Penn-Sheraton Hotel, Pittsburgh.

14 Independent Oil Men's Association of New England, annual meeting, Hotel Statler, Boston.

14-16 Southwestern Gas Measurement Short Course, University of Oklahoma, Norman.

15-17 National Petroleum Association, semiannual meeting, Hotel Cleveland, Cleveland.

15-17 American Petroleum Institute, Division of Transportation, annual tanker conference, Jung Hotel, New Orleans.

19-23 American Society of Mechanical Engineers, oil and gas power conference and exhibit, Shamrock-Hilton Hotel, Houston.

22-24 American Petroleum Institute, Division of Production, Mid-Continent district meeting, Herring Hotel, Amarillo, Tex.

22-24 Natural Gasoline Association of America, thirty-eighth annual convention, Baker and Adolphus Hotels, Dallas.

26-28 Texas Independent Producers and Royalty Owners Association, membership meeting, Baker Hotel, Dallas.

30-May 1 American Petroleum Institute, Division of Production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles.

MAY

1 Fourth annual petroleum accounting conference, sponsored by Wichita chapters of the Petroleum Accountants' Society of Kansas, National Association of Accountants, the Kansas Society of Certified Public Accountants, and the University of Wichita, Lassen Hotel and University of Wichita campus, Wichita.

3-6 Liquefied Petroleum Gas Association, twenty-eighth annual meeting and trade show, Conrad Hilton Hotel, Chicago.

4-7 American Geophysical Union, annual meeting, Washington.

5-7 Purdue University, fourteenth Purdue industrial-waste conference, Purdue Memorial Union Building, Lafayette, Ind.

6-8 American Petroleum Institute, Division of Production, Rocky Mountain district meeting, Gladstone, Henning, and Townsend hotels, Casper, Wyo.

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The OIL AND GAS JOURNAL

TULSA, OKLAHOMA

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JOURNALLY SPEAKING

Hot Cargo

IF YOU DON'T get any reply to something you mailed to The Oil and Gas Journal in the past couple of weeks, write us again. The trouble isn't our fault.

A Post Office truck caught fire on the streets of Tulsa, and burned up several sacks of mail. And some of it was for us. How much was completely destroyed we will never know, but the other morning the Post Office sent over a basket of charred bits and pieces—all that could be identified as being addressed to the Journal.

It was a sad sight as the remnants were gingerly spread out on a big table. Word got around the building fast, and the whole staff gathered.

In the middle of the group was the treasurer, painstakingly trying to decide which of the blackened and frazzle-edged checks might be accepted by the bank; which could be sufficiently identified to send back to the makers with requests for a reissue; and which were lost beyond redemption.

Hovering around the fringes of the sorters were the circulation manager, clucking his tongue over all the new subscription orders that probably were burned up completely and now he never would get; the advertising manager, wringing his hands because that pile of ashes undoubtedly contained a fat contract for 52 pages in color from that agency he had been working on for 6 months; assorted editors afraid that the articles they were expecting that day had gone up in smoke and the authors hadn't made carbons; and three stenographers who hadn't got letters from their boy friends for several days and now they'd never know whether they were mad at them or not.

Finally somebody had a bright idea. "Let's take a picture of this mess," he suggested. "Then we can send it to people who might have written us and prove it's not our fault that they never got an answer."

And then is when the second catastrophe of the day was discovered.

Safe Conduct

WITH THE CHARRED mail all spread out to make a good picture, somebody went for the office news camera. Naturally, it was locked up in the vault. We're very careful about things like that.

But, horrors, the vault was locked. And nobody knew how to open it. The man who usually opens it early in the morning (and lets the door stand wide open all day) was on vacation. And the man who opens it when the other man doesn't had been detained by a minor family emergency.

And nobody else could remember the combination. The head bookkeeper thought he could recall the numbers, but not their order, so he tried all sorts of possible arrangements but the tumblers didn't tumble. The executive vice president in charge of finance and accounting was called in but he was no help because he delegates to others such minor details as knowing how to open the safe.

The crisis deepened by the minute. Inside that vault was the petty-cash box with all the nickles and dimes for making change for the coffee machine. And that morning everybody in the building wanted coffee and nobody had any change. And just then the coke machine jammed and the key to it was—you guessed it—in the vault.

Things were getting desperate. A council of war was held and a general inquiry was conducted. Let's see now . . . Where do the two fellows who usually open the safe keep the combination?

Oh, on slips of paper way in the back of their desk drawers.

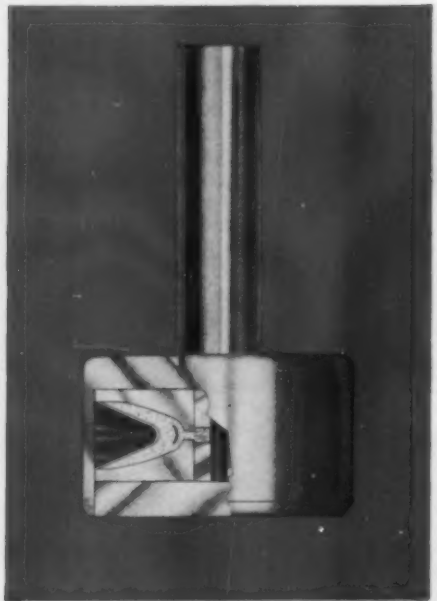
Well, why don't we dig them out? Both desks were locked.

Where are the keys?

Inside the vault, naturally. We're very careful about things like that.

—Henry D. Ralph

Welex EIGHT-WAY Frac-Jet*
Places the Wedge



ORIGINATORS OF Welex JET PERFORATING

Any lumberman will tell you that the way the wedge is placed determines the way a log is split along the grain of the wood—faulty placement and what should have been top-grade lumber turns out to be fire wood.

Any oilman will concur that for a successful fracture job, the placement of the fracture determines the end result after the well is treated.

Welex 8-Way Frac-Jet gives you just the start you need to control fracturing along the bedding plane of the rock. Actual tests by a major oil company proved this when horizontal fracturing was obtained in two separate zones in four wells 50 feet apart, each equidistance from an injection well in the center. Two shots with the Welex Frac-Jet and subsequent fracture treatment provided fractures from the center well to all four test wells—50 feet apart—with less than 2 feet variance in either plane *completely around* the injection well.

For actual controlled fracture placement—proved by a major oil company—let the Welex Frac-Jet give you the break you need.

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FPC strikes a blow for competition in fuels

IN rejecting all applications to bring additional natural gas into the upper Midwest area the Federal Power Commission made it plain that it was not doing so because of the opposition of coal interests.

In fact, FPC went out of its way to express disapproval of coal's plea for "carving out of the economy a preserve for one segment of one industry and insulating it from the competition which technological progress brings."

Let us hope that this decision signals the end of the fuzzy thinking about "end-use controls" which flourished in some FPC quarters a few years ago and which advocated that the commission regulate competition among fuels and tell each consumer what fuel he should use.

IT MAY BE TOO MUCH to hope that this rebuff will also end the coal industry's efforts to thwart expansion of oil and gas by imposing all sorts of governmental restrictions on them.

Coal has been called a backward industry, and one sign of its backwardness is the way it has always tried to suppress competition from other fuels instead of meeting it with improved technology and service.

Ever since the Natural Gas Act was passed coal interests have opposed just about every new gas pipeline, even though the only result of their obstructionist tactics has been to clutter up the record and prolong FPC hearings.

If coal's unprogressive attitude had been public policy, housewives today would still be carrying in a scuttle of coal to cook breakfast every morning.

At long last, and greatly to its credit, the coal industry is currently making strides in improving its technology in mining, preparing, and marketing coal, in cutting costs, in catering to consumer needs, and in promoting its products.

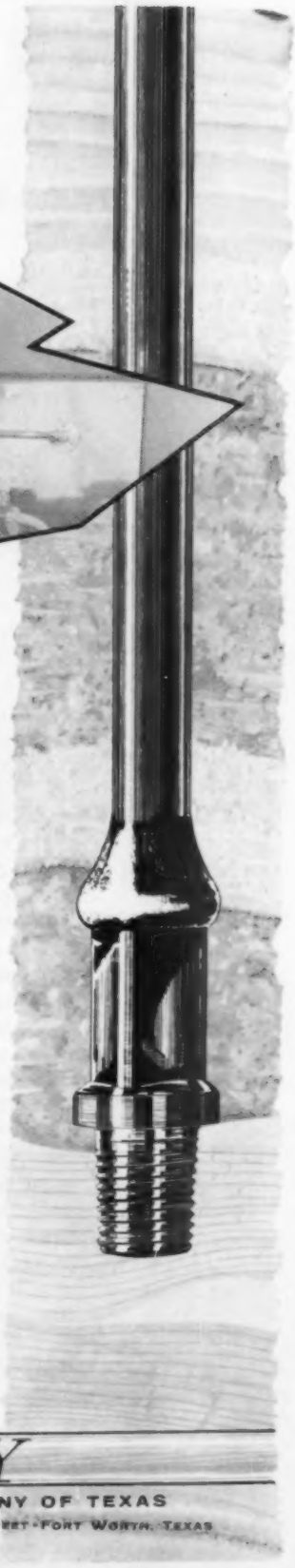
Along with these things coal should now acquire a spirit of competitiveness, a willingness to compete on merit in a free market. It should stop trying to hamstring the sale of gas and fuel oil by artificial restrictions to confine their markets and raise their costs.

NATURAL-GAS LEGISLATION has been fought by coal in the hope that continuation of the confusion caused by the Phillips decision would keep gas from expanding. The coal lobby served notice that it would block clarifying legislation unless it included new and different restrictions on gas for the sole benefit of coal.

It's time the public realized that much of the opposition to the Harris bills was generated by this dog-in-the-manger attitude.

It's time that the coal interests, and everybody else, realized that what's best for the nation is to permit all fuels to find their own customers and prices in open competition in a free market.

From LIBERTY TECHNOLOGY
an excellent NEW product created
to reduce the cost of pumping oil



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½-Inch Sucker Rod

PUMPING installations for most oil wells should use the time-tested, conventional methods. But for low fluid-volume wells to 5,000 feet in depth, you can save from 10% to 33⅓% with slim hole drilling and completion with the LIBERTY ½-Inch Sucker Rod and LIBERTY Pumping Units.

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LM-4

TWO GEOLOGISTS take a long look at Alaska's rugged scenery.

Alaska Drilling Due Big Pickup

● Leasing is heavy throughout much of the new state, but most drilling during the next few years will center around the Gulf of Alaska, the Kenai Peninsula, Cook Inlet, and the Bethel and Copper River basins.

OIL MEN in Alaska are busily laying the ground work these days for what could become this hemisphere's greatest oil province.

Actual exploration work is picking up at an ever-increasing pace. But the progress is orderly, tempered by a feeling of caution.

Those with experience in Alaska or who have investigated the territory have one report: The oil prospects of the country are fabulous, but so are the risks.

John Roderick, of the Alaska Scouting Service, highlights Alaska's oil status today in this way:

. . . **Anchorage** is the new oil capital. Work centers here, as 10 major companies and two independents so far have set up permanent offices in the city and other operators, lease brokers, and service organizations are moving in.

. . . **Leasing covers** 38 million acres out of the 400 million acres available.

. . . **At least 35** geological and geophysical parties were in the field in the past summer. The number is expected to grow next year.

. . . **Six drilling rigs** are expected to be active next season. And this figure could easily grow.

. . . **Costs will be extremely high** in Alaska. One estimate is that exploration and development costs there will be at least five times those in the continental United States. One reason is high transportation expense, which is estimated at $1 a ton mile.

. . . **Center of interest** in the next 10 years should be the Kenai Peninsula, around the Gulf of Alaska, Cook inlet, Bethel basin, and the Copper River basin. Lease holdings in other areas are considered so remote that economics of exploration and development will not make them attractive for a few years at least.

Hunt for land . . . But a giant leasing play in Alaska is not being confined to these favored areas (see map, p. 76).

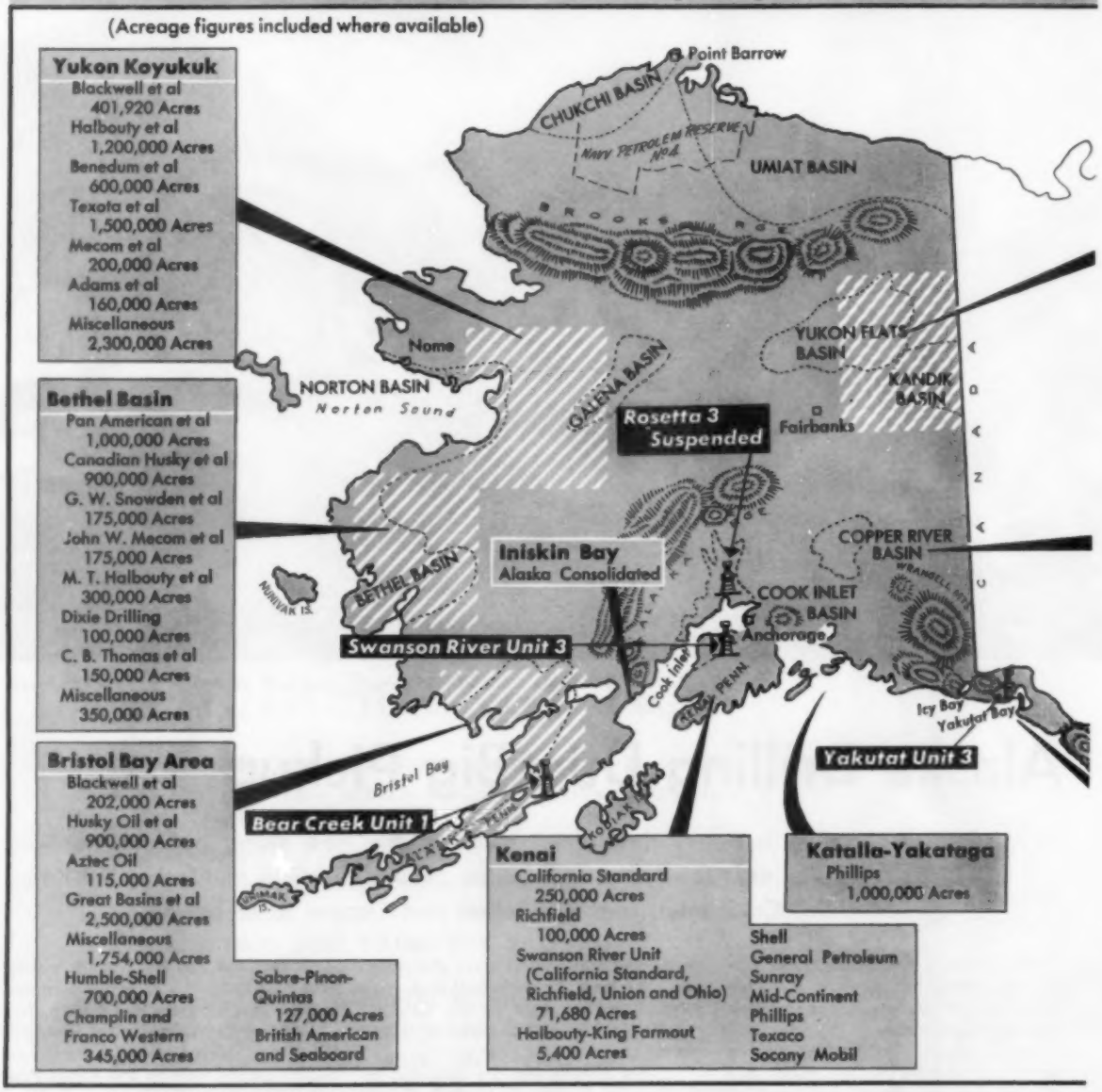
The big play started after Richfield Oil Corp. discovered Alaska's first big producing well on the Kenai Peninsula in July 1957. The play is showing only slight signs of slowing down.

At the time of the Kenai discovery, about 10 million acres were under lease in Alaska. The total is now estimated at 38 million acres under lease or applied for.

The play moved from the Kenai, much of which already had been leased by West Coast majors and individuals beginning in 1953, north and west into the Susitina flats and then over to the Bristol Bay area.

At the same time, heavy filings were made in the Copper River basin and down the Alaska Peninsula out toward the Aleutian chain. Leasing followed in the Yukon-Koyukuk area

Here's a Rundown on Company Leases



some 300 miles west of Fairbanks and moved on down into the Lower Bethel basin. Large amounts of acreage also were taken in the Kandik basin northeast of Fairbanks.

In all these basins this past season, oil operators have had geological and geophysical parties working.

Kenai is busy . . . Standard Oil Co. of California has had three geophysical parties busy on the Kenai.

They evaluated acreage which California Standard shares with Richfield under terms of a $30-million joint venture entered into shortly after Richfield's Swanson River Unit No. 1 discovery. Union and Ohio jointly own 10½ % of the unit.

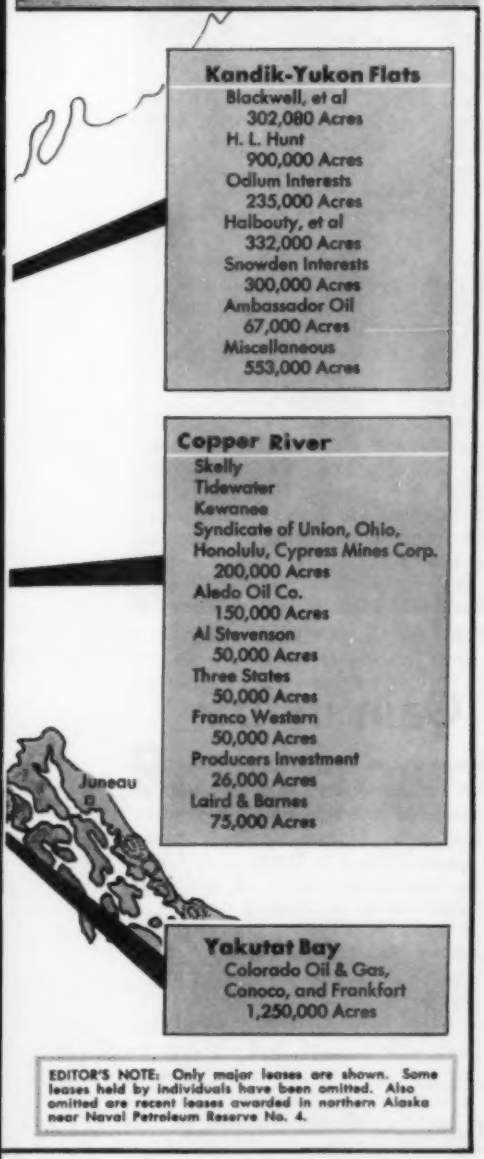
This well, completed September 28, 1957, had an estimated 900-bbl. daily flow of 33°-gravity crude and 122,000 cu. ft. daily of gas. Production was through 1½-in. choke at 11,131-70 ft. First shipment of crude from this well was made in October. The oil was trucked to Seward and shipped to California Standard's Richmond refinery.

Meanwhile, the third well is being drilled on the Swanson River unit. It currently is below 11,220 ft. with California Standard the operator.

After Richfield completed the Swanson River discovery well, it drilled a second test about 2 miles south and took it to total depth of 12,065 ft. No tests were run, but the same zone which produced in the discovery was located.

California Standard then assumed the drilling chore, sinking a 14,221-ft. well, the Deep Creek Unit No. 1, on southern Kenai. It was abandoned without production. However, California Standard felt warranted to do more geophysical work in the Bear Creek Unit on the strength of results of the hole.

in Alaska



EDITOR'S NOTE: Only major leases are shown. Some leases held by individuals have been omitted. Also omitted are recent leases awarded in northern Alaska near Naval Petroleum Reserve No. 4.

Last August, California Standard moved its rig back to the Swanson River Unit and spudded in the current test.

Most of the acreage which California Standard and Richfield control lies in the Kenai National Moose Range, which covers approximately 2 million acres on the Kenai Peninsula. In February of this year, Interior Secretary Fred Seaton agreed to open another 976,000 acres of the Moose Range to oil and gas exploration.

Issuance of the leases, however, was suspended until August because Congress was changing the rental from 25 to 50 cents per acre. Fewer than 500 leases have been issued since that suspension order was lifted, and there are still more than 9,000 leases still to be processed.

Others working . . . In addition to California Standard's seismic and gravity work on the Kenai, Union Oil Co. of California and Ohio Oil Co., working jointly, have had seismic crews on the peninsula.

Union-Ohio is expected to keep its geophysical crews working this winter and could begin drilling next season on their holdings adjoining the Standard - Richfield acreage in the north Kenai.

Humble Oil & Refining Co. has had seismic crews working in the Susitina flats north of the Kenai, as well as in the Bristol Bay area.

Humble is drilling a well on the Alaska Peninsula at Puale Bay under terms of a contract with Shell Oil Co. Under it Humble must drill three wells to gain a one-half interest in approximately 250,000 acres. Humble's Bear Creek Unit No. 1 well is below 12,000 ft.

Great Basins Petroleum Co. and General Petroleum Corp. have been doing seismic work in the Bristol Bay area this past season. Depending on the results of this work, General Petroleum is expected to lay plans to begin drilling in this area, perhaps next season.

At Yakatat on the Gulf of Alaska, Colorado Oil & Gas Corp. and Frankfort Oil Co. are drilling their third well—the 3 Yakatat. The first two wells had promising gas shows, but no production.

Continental Oil Co. has joined Colorado and Frankfort to gain a one-third interest in the approximately 1,100,000-acre development. Continental may increase the one-third interest to 40% by doing additional exploratory work during 1959-1960.

Anchorage Gas & Oil Development Co. has suspended its 3 Rosetta at 6,109 ft. at Houston, 20 miles north of Anchorage, with some oil and gas shows.

Other drilling . . . A few new wells are planned for the near future.

Michel T. Halbouty plans to begin drilling on 2,240 acres adjoining the Swanson River Unit on the northern Kenai in February.

He holds a farmout with King Oil Co. of Wichita Falls, Tex., from Alaska Oil & Mineral Co., Inc., of New York. Halbouty is now building a 5-mile road, and the rig is expected in Anchorage some time in December.

Other notable independents who have taken large land holdings in Alaska are John Mecom, Houston; David C. Bintliff, Houston; H. L. Hunt, Dallas; and Paul G. Benedum, Pittsburgh.

Alaska Oil & Mineral is planning to drill on the Iniskin Peninsula to the west across Cook Inlet from the Kenai. It is here that Russell E. Havenstrite, Los Angeles independent, drilled two wells, the first in the late 30's and the second suspended in 1955, without commercial production. Alaska Oil & Mineral expects to resume drilling at a new site using much of the equipment left by Havenstrite.

Mecom reportedly is assembling three rigs on ferry boats he purchased in San Francisco and will move the drilling equipment from the West Coast to Alaska this winter.

Three U. S.-based geophysical companies also have just completed moving equipment and contact representatives into Anchorage and will have crews available for work shortly.

Companies move in . . . Oil companies are setting up their offices in Anchorage in ever-increasing numbers.

Prior to the Richfield discovery, only Phillips Petroleum Co. had a permanent office in Anchorage. Since that time, Standard of California, Humble, Union Oil, Ohio, General Petroleum, Western Gulf, Richfield, Sunray Midcontinent Oil Co., Pan American, Halbouty, and Mecom have all established permanent offices there.

Service and supply companies are being established on a permanent basis also. There appears to be little doubt that the exploration activity will continue for the next 5 or 6 years on the strength of the impetus which already has been generated.

Effect of statehood . . . Most Alaskans and oil newcomers alike believe that statehood, now on its way, will have a stabilizing effect on the oil industry's future.

Legislation from Congress and rules and regulations from the Interior Department governing the oil and gas industry have been notoriously slow in coming.

Under statehood Alaska will be able to choose approximately 103,000,000 acres from public lands of the United States, including the mineral rights. Selection must be made within 25 years after the admission of Alaska into the Union.

The new state legislature will meet in January, and orderly selection of these lands is expected to begin.

The existing territorial legislation, most of which is expected to be adopted by the new state, provides for the issuance of oil and gas leases in

"substantial conformity with the Mineral Leasing Act of February 25, 1920."

Lawmakers believe that Alaska will honor all pending federal lease offers or applications covering any land to be selected. The new State of Alaska will have jurisdiction over the leasing of the inland navigable waters and also its submerged lands.

Laws and taxes . . . At present, territorial law is more favorable toward oil and gas exploration than federal law.

First year rental for federal lands in Alaska now carries a 50-cent per acre rate, whereas territory lands can be leased at 25 cents an acre.

Alaska law still carries a 5% incentive royalty allowance for a period of 10 years to the first producer in an area, whereas the federal rate has now been raised to 12½%.

The territory also has on its books a Tax Incentive Act which was passed to encourage and stimulate natural-resource development.

In 1955 the territorial legislature passed a 1% tax on gross production at the wellhead. This tax is in lieu of all ad valorem taxes now or hereafter imposed by the territory (or state), cities, towns, school districts, or other local government units upon any property rights attached to the rights to produce oil and gas.

Finally, the Alaska Oil & Gas Conservation Act has established Alaska as a member of Interstate Oil Compact Commission. Rules and regulations issued under the act have been accepted favorably by members of the industry in Alaska. Judging by past actions, the oil industry, therefore, can expect no drastic or punitive legislation from the new state.

New leasing . . . Stimulated by the renewed interest in oil and gas exploration, the Interior Department has opened up federal lands in the northern tip of Alaska.

Interior first opened for bidding the oil and gas leases in Gubik gas field on the Arctic Slope, adjacent to Naval Petroleum Reserve No. 4.

On September 3, bids were opened on 26 of the 640-acre parcels, the high bid going at $103 per acre and the low at $3.11. All told, the 16,000 acres were taken by Halbouty; Bintliff; Alaska Propane Co., Inc., of Fairbanks; Maurice Mac Goodstein, Beverly Hills, Calif.; and E. B. Towne, Jr., San Francisco.

Following the bidding on Gubik gas field, the Interior Department opened for simultaneous filing approximately 4 million acres on the Arctic Slope surrounding Gubik field. As of September 29, the date of the drawing, 7,406 applications had been filed on the 1,360 lease blocks.

The blocks went to Cortez Oil Co., Tulsa; Hunt Oil Co.; Southwest Petroleum Corp.; Sohio Petroleum Co.; El Paso Natural Gas Products Co.; Western Natural Gas Co.; Malco Refineries, Inc.; Alaska Petroleum & Gas Co., Inc., Fairbanks; and Freemont Petroleum Co., Denver, plus four or five majors using nominees.

One consultant who has looked over Alaska's prospects, however, warns that it's easy to get leases and assemble big spreads, but the hazard for oil men will be the tough operating conditions imposed by nature in the country.

His advice: Move carefully. Alaska is a swell place for the unwary to drop a lot of money.

Refining Capacity to Show Little Gain in '59

THE NATION'S REFINERS, who have been running well below capacity, won't be adding much basic crude-oil processing equipment next year.

A survey of operable refining capacity by the American Petroleum Institute indicates an increase of 0.9% during the first 9 months of 1959.

The API survey covers the year from September 30, 1958, to September 30, 1959. For this 12-month period it shows a 1.86% gain. But most of this is being added during the current quarter with the completion of the Hess Transport & Trading refinery on the East Coast and the expected completion of The Texas Co.'s refinery at Anacortes, Wash.

By the end of this year, the API says, refining capacity will total 9,683,100 bbl. daily. It will reach 9,771,950 bbl. by next September 30.

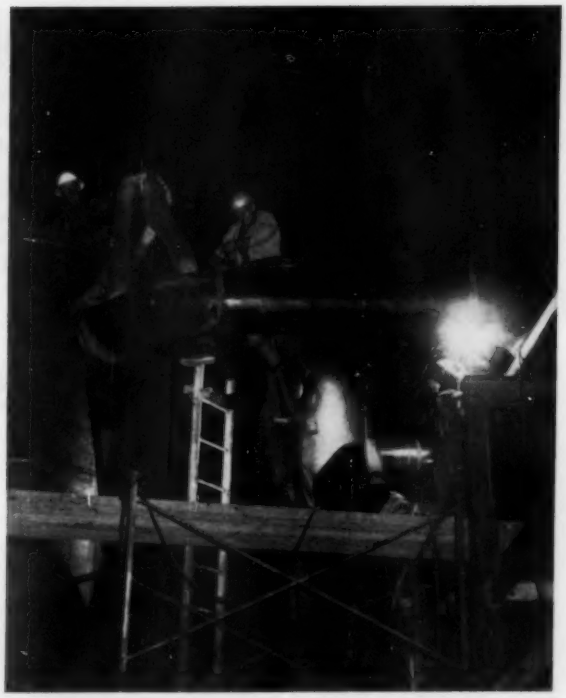
Not included is 60,600 bbl. of capacity which was shut down and in need of major repairs on September 30. The API figure includes 468,950 bbl. of shut-down capacity which is considered operable only on a marginal basis because of high costs. Also included is a figure of 113,300 bbl. representing crude oil which is charged direct to cracking units.

Except for 2 years, idle crude-oil capacity has increased steadily since 1951. In that year crude runs averaged 93.5% of capacity, but in 1958 the figure is below 83% (OGJ, Nov. 10, p. 116).

API Survey Shows Changes in U. S. Crude Capacity

District 1	Sept. 30, '58	Dec. 31, '58	March 31, '59	June 30, '59	Sept. 30, '59
East Coast	1,425,100	1,471,100	1,471,100	1,471,100	1,471,000
Appalachian No. 1	108,950	108,950	111,450	111,450	111,450
District 2					
Appalachian No. 2	112,000	112,000	112,000	112,000	112,000
Ind.-Ill.-Ky.	1,707,700	1,707,700	1,721,400	1,738,400	1,740,400
Minn.-Wis.-No. and So. Dakota	130,300	130,300	130,300	131,700	131,700
Okla.-Kan.-Mo.	795,200	800,700	800,700	800,700	800,700
District 3					
Inland Texas	372,350	372,350	373,100	373,100	373,100
Texas Gulf	2,201,900	2,203,400	2,218,400	2,218,400	2,218,400
Louisiana Gulf	779,900	779,900	779,900	779,900	779,900
No. La.-Arkansas	126,600	126,600	127,600	127,600	127,600
Rocky Mt.-N. Mex.	28,300	28,300	28,300	28,300	28,300
District 4					
Other Rocky Mt.	333,650	335,650	335,650	337,650	338,650
District 5					
West Coast	1,471,650	1,506,150	1,506,150	1,538,650	1,538,650
TOTAL U. S.	**9,593,600**	**9,683,100**	**9,716,050**	**9,768,950**	**9,771,950**

YOU DON'T BUILD pipelines this way usually, but El Paso Natural did in an emergency crossing of the San Juan River. The crash crossing and . . .



WORKING AROUND THE CLOCK on a compressor station at Aneth field helped get the big field back on production following the shutdown by federal officials.

Rush Project Ending Aneth Shutdown

ANETH field production rose rapidly to two-thirds of normal last week as operators complied with the federal ban on wasting gas in the southeastern Utah field.

Clearance for individual wells to resume production was granted by the Interior Department's Roswell, N. M., district office as tie-ins were completed with El Paso Natural Gas Co.'s gathering system. Interior had clamped down on production November 10 to prevent flaring of gas (OGJ, Nov. 17, p. 134).

Production was being resumed by all operators who had received temporary certificates to sell their gas to El Paso. The Federal Power Commission had granted certificates to 14 of the 17 producers involved.

El Paso's new facilities can handle about two-thirds of the available gas, which was being flared at the rate of about 65,000 M.c.f. daily. Sometime next month the company expects to be ready to take virtually all of gas volume.

Several of the 300 wells affected in the 357-well area were going back on production within 48 hours of the FPC action. And thanks to El Paso's crash construction program, its new pipeline to Aneth was ready to take gas and thus end the shutdown which had cost producers some $2½ million in revenue. Late last week, here was the picture in the Four Corners field:

. . . **Production was around 60,000 bbl.** daily compared to 90,000 bbl. daily before the shut in of wells located on Navajo Indian land.

. . . **El Paso was taking** almost 50,000 M.c.f. daily of gas from 37 batteries to which 200 wells are connected.

. . . **Texas-New Mexico Pipe Line,** which pumps Aneth crude east to connecting carriers at Jal, N. M., resumed operations after a shutdown of almost 2 weeks. The 16-in. line was moving some 40,000 bbl. daily compared to the pre-shutdown throughput of 66,000 bbl. daily.

. . . **Four Corners Pipe Line,** the area's other 16-in. outlet which moves Aneth and northwestern New Mexico crude to Los Angeles, was moving a normal volume of 55,000 bbl. daily. During the shutdown it pumped some 35,000 bbl. daily, of which 25,000 bbl. was from New Mexico and the rest from state and private lands and others exempted from the shut-in order.

Pipeline expansion . . . El Paso pulled out all the stops to complete its $14-million project in time to minimize the loss of production caused by the federal order. And the facilities are still being expanded so that no production restrictions should remain by the end of the year.

From October 10 to November 10, Fish Engineering Co., the plant contractor, worked two 11-hour shifts to complete the plant on time. And the APV Co., river-crossing contractor, installed a temporary crossing of the San Juan River (see photos). R. H. Fulton & Co. got the main line in the ground and Engineers Limited Pipeline will finish the gathering system within a month.

The system includes 76 miles of 16 and 20-in. main line, 106 miles of gathering line, and a 10,200-hp. compressor station.

Expansion to the full authorized 30,600 hp. is planned by next March, which will provide capacity to handle 100,000 M.c.f. daily contracted by El Paso.

A 115,000-M.c.f. natural-gasoline and dehydration plant, still to be approved by FPC, is scheduled for completion next spring.

Imports Run Low on Eve of New Plan

OIL IMPORTS have dropped below the national total allocated under the voluntary control program.

Figures for October, released last week, showed a surprising reversal of the trend in recent months.

Latest monthly statistics were disclosed by Capt. Matthew V. Carson, Jr., imports administrator, as the Cabinet fuels committee neared completion of an import-control plan to replace the present one.

Crude imports averaged 922,400 bbl. daily in October, compared with a national allocation of 934,100 bbl. a day. Imports of unfinished products dropped to 162,600 bbl. a day, 16,800 bbl. daily below the quota.

Capt. Carson's summary, although far more optimistic than preceding ones, reemphasized some glaring loopholes in present voluntary controls. Some companies, notably Eastern States Petroleum & Chemical Corp., continued to ignore the quotas set for them.

In Districts 1-4, which include

Here's a Company-by-Company Look at October Imports

CRUDE OIL—DISTRICT 5

(Thousands of barrels daily)

	Allocation October	Actual October	Actual September
	1958	1958	1958
Bankline	2.3	0	7.0
Caminol	2.8	2.8	2.8
Century	1.5	0	0
Douglas	4.4	3.8	8.3
Edgington	2.8	2.4	1.5
Envoy	1.2	0.7	4.7
Fletcher	5.2	5.2	8.0
Golden Eagle	2.3	4.1	0
General Petroleum	24.0	23.5	23.2
Hancock	4.0	0	0
Manespo	1.4	0	0
Macmillan	2.3	2.3	2.3
Mohawk	2.9	0	8.6
Richfield	8.5	6.4	5.2
Rothschild	2.7	5.2	0
Shell	30.5	28.2	28.1
Socal Oil & Refining	1.0	0	0
Standard of Calif.	27.9	33.4	17.9
Sunland	2.3	0	3.9
Texaco	19.4	10.7	19.6
Tidewater	35.6	44.1	35.8
Union	11.6	11.4	14.9
U. S. Oil & Refining	7.5	0	0
Wilshire	17.0	11.3	17.7
Total	**221.1**	**195.5**	**209.5**

CRUDE OIL—DISTRICTS 1-4

(Thousands of barrels daily)

	Allocation October 1958	Actual October 1958	Actual September 1958
Atlantic	50.2	44.6	45.2
Aurora Gasoline	3.5	3.5	3.5
Bay Refining	2.7	3.0	3.0
Cities Service	27.8	24.1	29.5
Clark	2.0	5.9	0
Continental	5.0	5.0	5.0
Crown Central	4.3	4.3	1.3
Danaho	0.5	0.5	0.5
Delta	3.0	*9.0	*9.0
Dow Chemical	0.3	0	0
Eastern States	15.6	†55.1	†65.9
Gabriel	6.4	6.4	6.6
Great Northern	28.1	22.0	31.0
Gulf	95.1	91.9	98.9
Hess, Inc.	9.8	10.5	16.7
Ingram	3.5	8.7	4.4
International	10.5	9.0	10.5
Lakehead	0.3	0.2	0.2
Murphy Corp.	4.3	4.6	5.0
Northwestern	11.5	9.5	8.4
Ohio Oil	3.5	3.6	3.5
Phillips	10.2	10.0	10.0
Pure	5.0	4.8	5.0
Republic	4.0	6.9	3.9
Shell	6.4	5.1	2.4
Sinclair	53.0	52.6	53.3
Socony Mobil	57.2	50.9	57.2
Southwestern	2.5	4.6	3.8
Standard of Calif.	56.9	55.1	66.0
Standard of Indiana	25.4	23.6	24.3
Standard of N. J.	61.4	65.5	61.6
Standard of Ohio	7.0	9.4	11.4
Sun	43.0	26.3	39.8
Sunray Mid-Continent	5.0	5.7	5.0
Tennessee Gas	3.5	3.6	0
Texas Asphalt	2.0	2.0	2.0
Texas City Refining	4.0	8.2	4.3
Texaco	46.4	45.9	45.7
Tidewater	29.2	24.4	36.0
United	3.0	2.9	0
Total	**713.0**	**728.9**	**778.8**

*Estimated. †From Texas Railroad Commission.

UNFINISHED GASOLINE, OTHER UNFINISHED OILS

DISTRICTS 1-4

(Thousands of barrels daily)

	Average May-June	Actual October	Actual September
	1958	1958	1958
Atlantic	5.7	3.3	3.9
Cities Service	0	0	3.5
Crown Central	5.6	9.1	5.4
Eastern States	12.3	†0	†0
Gulf	16.3	16.4	15.5
Hess, Inc.	25.3	26.9	31.5
Sinclair	7.3	8.3	9.9
Socony Mobil	19.7	16.1	26.4
Southwestern	4.1	4.2	0
Standard of Calif.	8.5	14.4	16.1
Standard of Indiana	24.8	19.1	35.4
Standard of Ohio	1.7	0	0
Texas City Refining	7.0	4.1	3.8
Texaco	13.8	9.8	15.4
Tidewater	20.0	17.5	28.7
Union	4.7	8.7	5.4
U. S. Oil & Refining	2.6	4.7	4.3
Total	**179.4**	**162.6**	**205.2**

†From Texas Railroad Commission.

principally the states east of the Rockies, crude imports continued to exceed the quota. However, the October flow of 728,900 bbl. daily was about 50,000 bbl. per day below September receipts and 40,000 bbl. below the August level.

While crude imports into Districts 1-4 remained an estimated 15,900 bbl. a day above quota, this excess was more than offset in District 5. Capt. Carson said October crude imports averaged 195,500 bbl. daily in this district, which includes California, Washington, Oregon, Nevada, and Arizona. District 5 allocations total 221,100 bbl. daily.

Capt. Carson's report excludes some crude-oil imports, principally those which are transferred to residual fuel oil.

Crude entries broke through the allocation ceiling in August for the first time in 11 months. When September receipts proved to be even higher, there was talk that the voluntary program might be replaced by mandatory controls in January.

New plan delayed . . . The latest report, coming just as the Cabinet fuels committee was wrestling with the imports problem, seemed to offer some hope for continuation of a voluntary program.

A new plan was expected to be announced last week, but a committee spokesman said the group "ran into a little bit of a snag" which might cause some delay.

The committee, acting in a presidential advisory role, has been considering various conflicting proposals to put teeth into imports controls. One plan that reportedly has been considered is to impose an excise tax on products imports exceeding the recommended level.

Capt. Carson pointed out in his report, though, that imports of products covered by the control program had fallen back below the recommended ceiling.

Receipts of unfinished gasoline and other unfinished oils averaged 162,600 bbl. daily in October, Carson reported. This total is 16,800 bbl. a day below the May-June average at which Carson had hoped to draw the line.

Products imports in September had jumped to more than 205,000 bbl. a day, exceeding the suggested total by about 25,000 bbl. daily.

Although total imports have decreased, compliance with the voluntary program continues to be spotty.

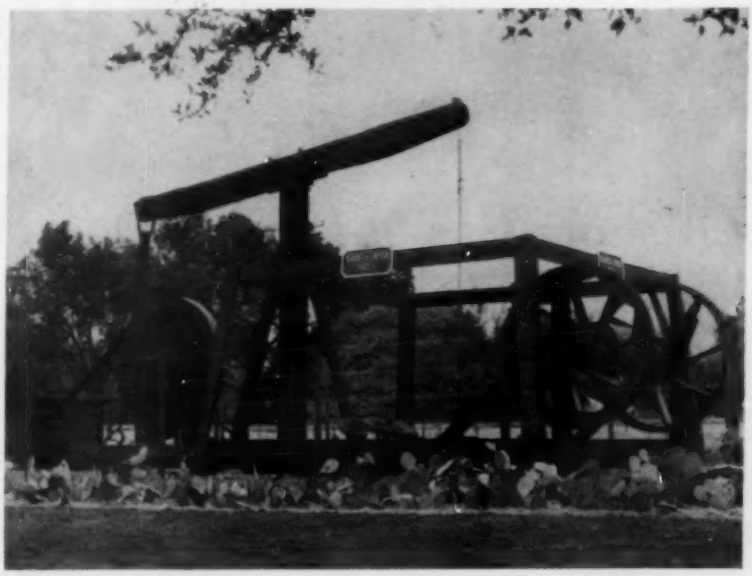
Fifteen companies in Districts 1-4 and five in District 5 exceeded their crude quotas. In some cases, excess imports in October offset earlier receipts which fell short of allocations.

Those over quota . . . Eastern States continued to lead the parade of companies defying controls.

Its crude imports, according to reports filed with the Texas Railroad Commission, averaged 55,100 bbl. daily in October while its quota was only 15,600 bbl. daily. Carson relies on Railroad Commission figures in the case of Eastern States because the company has refused to report its activities to him directly.

Delta Refining Co. also continued to ignore the controls. Its October imports, based on estimates since the company is not compelled to report to either Carson or the Railroad Commission, averaged 9,000 bbl. daily. Its quota is 3,000 bbl.

Tidewater Oil Co. again exceeded its over-all crude-oil quota. Its West Coast imports were some 8,500 bbl. a day above allocation, but this excess was partly offset by its East Coast imports which fell 4,800 bbl. a day below quota.



Old Rig Becomes Memorial

. . . in Texas. Schools pay tribute to industry by setting up permanent monument to Permian basin discovery.

OIL got some favorable national publicity for a change last week.

A nation-wide television audience saw the University of Texas and Texas A. & M. College take occasion Thanksgiving Day to thank the oil industry, before the kickoff in Austin of their traditional football battle.

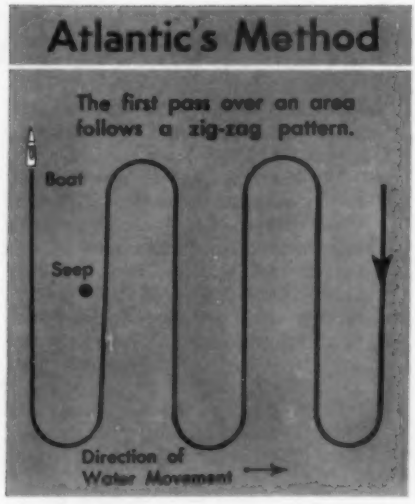
The two schools have a lot to thank the industry for—roughly $300,000,000, in fact, in the Permanent University Fund, the endowment which serves both institutions.

They expressed their appreciation by dedicating a permanent memorial on the Texas University campus to the famous oil well which triggered the flow of oil money into the fund. This was the 1 Santa Rita, the discovery well of Big Lake field in Reagan County and the strike which opened up the huge Permian basin area of West Texas in 1923. The well was the first completed on university lands.

The memorial is the old Santa Rita rig itself, minus its wooden derrick which long since rotted away. The rig was dismantled in 1940 and sent to the university campus in Austin, where it remained in outdoor storage until this year. Despite its 35 years, the rig's heavy wooden sills are still in good shape. Refurbished a bit, it even "pumped" again for the TV audience last week.

The old rig, set among cactus and sage and surrounded by barbed wire, sports bronze tablets on three sides which tell its story. Later the memorial will be "wired" so that visitors may push a button and hear a 5 to 10-minute history of the well and its influence on the university.

ATLANTIC is using this small boat . . .



and this method . . .

Offshore Gas Seeps Are Detected Quickly With

- Large areas can be combed for as little as 2 cents an acre using infrared analyzer to pinpoint methane.

AN ATLANTIC Refining Co. research team has perfected a means of detecting and tracking down hydrocarbon seeps in submerged areas.

Atlantic personnel feel the new technique will be useful in taking a cheap first look at the oil and gas possibilities of virgin exploratory areas. It might also be used to pin down the more promising portions of such an area.

The method has been under development, including extensive tests in coastal waters off Texas, for several years. Five major surveys covering a combined area of several million acres have been run with good results in foreign waters—one of them covering 4,000,000 acres.

How it works . . . The key element in Atlantic's seep bloodhound is an infrared analyzer unit which checks for methane.

The apparatus is mounted on a small barge or boat. Water is pumped aboard and sampled steadily as the boat moves. Dissolved air, and gas if there is any, is separated from the water, dried, and checked by the analyzer. Results are plotted continuously on a strip chart.

The vessel, of course, follows a planned course. It takes advantage of the fact that there is a consistent water movement or "current" in every water body. The boat follows a zig-zag course, doubling back and forth in a general "upstream" direction—much like a bird-dog moving against the wind.

With the zig-zag operation, the analyzer can detect a gas seep several miles away.

Once evidence of a seep is detected, the general location is plotted. The boat then continues on course to finish the broad canvassing of the entire survey area. It returns later to pinpoint the seeps, abandoning the zig-zag course.

How about oil? Atlantic operates on the premise that where there's oil there'll be some gas in most cases. The technique, however, will not detect dead oil.

The analyzing equipment is extremely sensitive. It has sniffed out and located seeps leaking as little as 0.5 cu. ft. per hour.

Effective 30 miles . . . Atlantic operates its seep-searching surveys with the aid of simple navigational radar. Using this navigational system, the maximum range of the survey is about 30 miles from shore.

When the apparatus tracks down a seep, the location is fixed permanently through the use of a transparent overlay map placed directly on the radar screen. The shoreline on the map and on the radar screen are matched. Since the boat location is always in the center of the screen, the seep location is easily plotted.

Atlantic doesn't "believe" a seep unless it can revisit the location and find the seep again at least a week later. It's possible, it says, to find gas sometimes where there is no seep. For instance, marsh gas might have been carried into a bay by a river.

Seldom, Atlantic points out, can a gas seep be seen at the surface of an open body of water. Even if it is a very large one, it is invisible from just a few feet away.

Cheap and speedy . . . Seep finding is an unusually fast exploratory method. The only limitation on the speed with which a survey can be carried out is the speed of the boat. Atlantic has run surveys at speeds up to 12 knots.

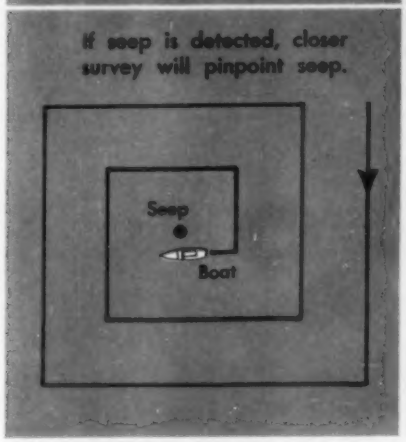
The survey apparatus is small enough to enable the surveyor to use a relatively small boat. Atlantic, for instance, has run surveys in protected waters using a 22-ft. outboard-powered barge. The gas separating and analyzing units combined take up about the same space as a normal-sized office desk.

Larger boats are required where water is rough.

Cost of running a seep-finding survey compares favorably with the cheapest geophysical methods known. On a large area, Atlantic says, the cost will run around 2 cents an acre. The expense will run somewhat higher with small surveys or where a large number of seeps are found and must be tracked down.

The cost of seep-finding, thus, is about in the same ball park as that for airborne magnetometer work. This, Atlantic says, compares with a

of Finding Seeps



in locating offshore seeps.

New Technique

roughly estimated average cost of about 75 cents an acre for simple seismic reconnaissance grid work in marine areas.

A patent covering the method is expected shortly.

Roughnecks Win

labor dispute. NLRB rules against Texas drilling firm.

THE NATIONAL Labor Relations Board clamped down last week on a Texas drilling contractor for firing four roughnecks because they joined a labor union.

Montex Drilling Co., Fort Worth, was ordered to offer the discharged workers their old jobs or "substantially equivalent positions" and to reimburse them for any loss of pay which they may have suffered because of the "discrimination."

A company spokesman allegedly threatened to shut down Montex rigs if the crews joined the International Union of Operating Engineers, which was seeking to represent the workers. The NLRB held that such statements contained "threats of economic reprisals" for union activities.

The dispute arose in October 1957. The company contended that the roughnecks were not actually fired, but that their employment ceased when their driller was discharged.

In its ruling the NLRB ordered the company to post notice that it will not illegally discourage union membership or activity in behalf of the union.

watching WASHINGTON

Joe Reilly

• Will the new Congress sock the consumer?

ALL THE EXCITEMENT over a threatened increase in the federal gasoline tax generally overlooks a couple of pertinent points.

First, there is some consolation in the fact that Congress may look unkindly on a tax increase, even (or especially) if it carries Ike's blessing.

The second point is less reassuring to the oil industry and the public in general: Tax hikes on gasoline may be a greater threat at the state level than at the federal level.

Congress will start its session with a recently reaffirmed mandate to look out for the interests of the "little man." Hence, it won't be inclined to rush in with a new tax which would directly hit some 60 million motorists. That would stir up too many voters.

More money is needed if the federal highway-building program is to continue on schedule. At the present rate of spending, the highway fund is expected to be nearly $1 billion in the red by mid-1960.

• New taxes aren't the only answer

SEVERAL ALTERNATIVES to a tax hike are being talked.

One is to divert more highway user taxes from the general fund to the road-building program. This plan is backed by the American Petroleum Institute and the National Highway Users Conference.

Last fiscal year about $1.5 billion from special taxes on motorists went into the U. S. general fund rather than the highway trust fund. If just part of this sum were dedicated to highways, the construction program could stay in the black. The plan has one obvious drawback, though. It would increase the general-fund deficit.

Another plan which has been suggested would permit the road-building program to continue as scheduled, with the deficit to be covered by revenue bonds or certificates of indebtedness issued against future collections for the highway fund. The bond system probably would involve an extension of the temporary 1-cent per gallon gasoline tax. It is scheduled to expire in 1972.

However palatable a deferred payment plan may be to some of the "big spenders," it is likely to run into the opposition of Sen. Harry F. Byrd. As watchdog of the treasury, he frowns on schemes which would make future generations pay for our luxuries. But such a plan may appeal to the spend-now-pay-later group in Congress.

• States want a bigger slice, too

THE FEDERAL TAX on gasoline was increased from 2 cents a gallon to 3 cents in 1956 to help pay the federal share of the interstate highway program. Still, the federal take represents only about one-third of the total tax on gasoline.

The API board of directors pointed out recently that state and federal gasoline taxes combined averaged about 9 cents per gallon. That amounts to about 41% of the retail price.

While the states are getting almost twice as much from gasoline taxes as the federal Government is, they are constantly looking for more road funds. Almost every year one or more states will nibble a little deeper into the motorist's gasoline dollar. Gasoline taxes now account for about 11% of all state revenue.

Under the new federal-aid highway program, the states have a stronger argument than usual for raising gasoline taxes. Legislators can show that for every dollar the state fails to raise for its share of the interstate system it will stand to lose several dollars in federal matching funds. That's an argument that Congress won't have.

Sulfur, LPG Line Set

. . . by Canadian firm. Unique proposal calls for moving gas byproducts from Alberta to markets in the East.

PEMBINA Pipe Line, Ltd., plans to build a 1,200-mile pipeline to carry sulfur, LPG, and natural gasoline from Alberta's gas fields to eastern Canada.

The company will likely seek approval of the unusual plan early in January. The big pipeline would cost about $150,000,000.

Approval of the pipeline is needed from the Federal Board of Transport Commissioners. Product export must be approved by the Alberta Oil and Gas Conservation Board.

Tied in with the proposal is a study being made by Foothills Products Pipe Line, Ltd., for an LPG line to the Pacific Coast from Alberta. Foothills was formed 2 years ago by Pembina and Mannix Co. Ltd.

Apparently the over-all plans have not entirely jelled. Pembina is still thinking in general terms and figuring the angles. Here are some of the possibilities:

. . . **A line running west** from Alberta to Vancouver, B.C., to carry the hydrocarbons, with another line to carry sulfur to the Port Arthur-Fort William area in Ontario or to Superior, Wis.

. . . **Separate lines** for different products from Alberta eastward to Lake Superior, or one line carrying all the products eastward.

Although several routes to the east have been considered, the one which seems to hold the most interest is that of the existing Interprovincial crude line to Lake Superior.

Sulfur market . . . The logical outlet for the sulfur produced in Alberta seems to be the eastern part of Canada and the U. S.

Industries in the Great Lakes area consume about 1,500,000 long tons of sulfur annually. The current price of sulfur, mainly from Louisiana and Gulf of Mexico deposits, is about $28 per ton.

By pipeline, Pembina figures it can deliver it for about $16 per ton.

Pembina estimates Alberta's gas byproducts output will be about 170,000 bbl. daily over a 10-year period. Alberta will require about 45,000 bbl. daily, leaving 125,000 bbl. for markets outside Alberta.

The Borden Commission recently took a firm stand against flaring and waste of byproducts, so Pembina feels it has a proposal which should find a friendly ear both in the provincial and federal capitals.

Western line . . . Foothills has spent about $200,000 in engineering and cost studies for a westward line to the Pacific Coast (OGJ, July 14, p. 78).

The company has decided that the plan would be safe economically, if further export of gas from Alberta is permitted.

Pembina is closely watching a proposal by Alberta & Southern Gas Co., Ltd., and Westcoast Transmission Co., Ltd. The two companies have joined forces in a plan to build one major export gas line from Alberta to the Idaho border.

James A. Scott, Pembina president, said that his company's proposal for a west-coast line would become a safe venture as a result of surplus products which would come from increased production to serve a new line to Idaho.

Details of financing Pembina's proposal have not been completed.

Atlantic Wins Tax Fight

THE OKLAHOMA Supreme Court has ruled that an oil producer may deduct his trucking cost before paying the state's 5% gross production tax.

Since an estimated one-eighth of Oklahoma's oil production is trucked to pipeline for sale, the ruling will result in considerable saving to oil producers and a loss in the state's revenues.

State tax officials reported it was impossible to estimate accurately how much a dent the decision would mean in the $30 million annually collected from the gross production tax.

The 5-4 decision was made on an appeal by Atlantic Refining Co. which objected to paying the tax on the posted price. Atlantic contended the tax base should be the price received at the pipeline. This price is the posted field price less trucking cost. The court upheld Atlantic's contention.

the JOURNAL *said . . .*

50 years ago

January 6, 1908

Crude oil will be used as fuel from January 1, 1909, by practically all the stationary boilers engaged in the construction of the Panama Canal. It is estimated that the monthly consumption of oil at that time will have reached 24,080 bbl. and that the actual saving to the commission by substituting oil for coal will be at least 65%.

Oil is delivered on the isthmus by the Union Oil Co. under a concession granted January 10, 1906, for the construction and operation of a pipeline from the Pacific to the Atlantic side of the isthmus, over land owned by the U. S. and the Panama Railroad Co.

A correspondent at San Diego de la Mar, Mexico, says the newspaper report to the effect that the wild gusher on Pennsylvania Oil Co.'s property had again caught fire is erroneous. Gas from the well killed two peons and eleven mules in a single day.

25 years ago

November 30, 1933

Pure Oil Co.'s No. 2 W. W. Hoyt broke all Michigan records when it blew out an oil saver from the control head and ran wild for 2 hours at a rate giving the well an estimated potential of more than 20,000 bbl. a day. The new well has double the initial of any other completion in the state.

The East Texas field continues to be a thorn in the side of the conservationists. The attitude of certain refiners and producers, and occasional decisions by Texas judges, seem to work against the oil industry's effort to stabilize the business, notwithstanding the effort is backed by the powers set up by Government.

Secretary Ickes, oil administrator, today formally announced that the Petroleum Administrative Board, at his request, was preparing to make a thorough investigation of petroleum pipeline operations.

10 years ago

December 2, 1948

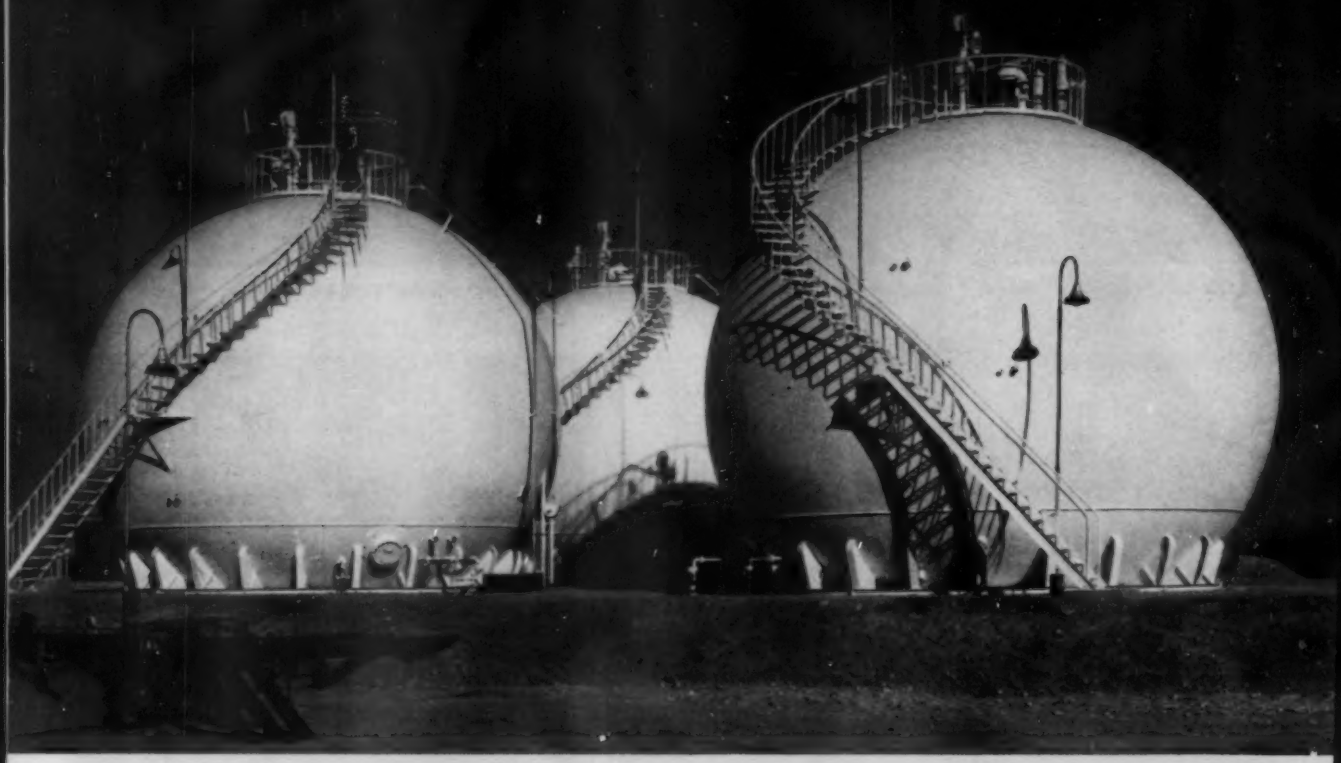
Interior Department officials are still apprehensive over the possibilities of an oil shortage this winter. Their fears that a colder-than-average winter, a major strike or disaster, increased military demand, or other unpredictable happenings might upset the balance between supply and demand were disclosed this week with release of a letter written by Sec. J. A. Krug to Commerce Sec. Charles Sawyer.

"Supply and demand are in approximate balance, but the balance is precarious," Krug declared.

Fourth oil field in open waters of the Gulf of Mexico has been brought in 5½ miles offshore from Caminada Pass, La., at the west end of Grande Isle. The latest wildcat strike in the big offshore drilling program currently under way was drilled by Humble Oil & Refining Co.

HORTONSPHEROIDS...

the natural way to store natural gasoline and stop evaporation loss



Hortonspheroids® are used to store liquids that are too volatile to hold at atmospheric pressure. They prevent breathing and boiling losses and reduce filling losses to a practical minimum. No vapor can be lost as long as the internal pressure does not exceed the settings of the pressure relief valves.

The three 3,500-bbl. Hortonspheroids above were erected for the storage of natural gasoline at the Texas Natural Gasoline Corporation, Perkin's Plant, Coke County, Texas. They are designed for 45 lbs. per sq. in. working pressure and were pickled and painted by the Horton® Pickling Process, an efficient means of removing mill scale from steel to provide a better bond between paint and metal.

Hortonspheroids are built in capacities to 120,000 bbls. and for pressures to 100 lbs. per sq. in. in smaller sizes. For further information please write our nearest office.

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Above: Three 3,500-bbl. Hortonspheroids, built by CB&I for the Texas Natural Gasoline Corporation, Perkin's Plant, Coke County, Texas. The structures are 35 ft. in diam. and were designed for a working pressure of 45 lbs. per sq. in.

CBI

OIL BOOM in Happy Valley brings strange activity, like crews laying gathering line to outlying wells.

TANK TRUCKS leave Kentucky's new oil field every 10 minutes for the 80-mile run into Louisville.

Kentucky's Green County Play Is an

• Already 500-odd wells are producing 19,000 bbl. daily; 200 rigs are busy.

FOLKS have quit laughing at the "poor boy" oil field in Kentucky's Green County.

It shows signs of growing into a lusty oil pool. And it's making healthy chunks of money for the odd assortment of farmers, shopkeepers, promoters, and a handful of veteran oil men who are in the thick of the play.

The young Green County field gained in stature only last week when Ashland Oil & Refining Co. revealed it is planning a $2-million, 80-mile pipeline from the field.

Ashland already has invested $200,000 in a gathering system for the field's 500-odd producing wells. This system delivers crude to a terminal near Greensburg. From there it is trucked to a river port at Louisville and barged to Ashland's Catlettsburg refinery.

The new pipeline will move crude from Greensburg to Louisville for barging to the refinery.

But the Green County field already had gained a bit of respectability before the pipeline plans were known.

Oil men just don't ignore an area which has:

. . . 19,000 bbl. daily production.

NEW OIL tanks go up for Ashland, big buyer in the field.

DRILLERS close in on some Greenburg residents (above) . . .

BUT SOME (below) are inclined to ignore whole affair.

POWER lines mean electricity to produce the oil.

Oil Man's Paradise

. . . **Nearly 200 rigs** running.

. . . **Prospects of production** totaling up to 5,000 to 6,000 bbl. an acre.

. . . **Drilling depths** of only 400 to 600 ft.

Even farmers and shopkeepers know this may not be another East Texas, but the Green County play will do until something bigger comes along.

The field . . . Unusual feature of Green County is the absence of major oil companies.

One major company sent a landman into Green County early in the play to look things over. He liked what he

saw so much he resigned his job and stayed to get in on the money.

First development in the area was made by farmers and townsmen of Greensburg plus a few from Louisville. Most prominent outsider is W. L. Lambert of Louisville, who has developed some of the most important production and has great influence in the region.

Lambert is an 80-year-old veteran of 60 years in the oil business. He has 1,200 bbl. daily production in Green County and still hasn't drilled his inside locations. Oil men estimate he could boost his production to 3,000 bbl. daily with more drilling.

Another producer, Leeco Oil Co., owned by Greensburg interests, has an estimated 2,000 bbl. daily production from some of the field's best wells.

Development started early this year 2 to 3 miles southwest of Greensburg in central Kentucky. But the big field was brought in later this spring 2 miles northwest of Greensburg. The two areas since have been linked.

The field would be a petroleum engineer's nightmare—if there were any petroleum engineers around. The field violates all the rules, and so far engineering has played a very minor role in the play.

The main field runs about 10 miles long and varies upward from a mile wide. Drilling is now progressing on stepouts, 5-6 miles beyond production with mixed results. Outside the "big field," production is spotty, with no correlation between elevation and production. Some dry holes, for instance, are drilled in locations surrounded by producers, and vice versa.

Petroleum engineers who have looked at the field, roughly estimate that 9,000 to 10,000 acres will produce oil. The better wells are expected to run as high as 5,000 to 6,000 bbl. per acre. And the best estimates on reserves range between 11,000,000 and 12,000,000 bbl. of recoverable oil.

The sand . . . The Green County field produces from a vugular limestone in the Silurian, locally called the blue sand.

The producing limestone is encountered at depths of 400-600 ft. The trend is NNE-SSW with updip to the east where the oil section pinches out and wells make mostly water.

Limits are not clearly defined on the west.

Another peculiarity of the field is the absence of a clear oil-water interface. Oil is above, below and intermixed with water in formation.

Drilling . . . No one knows exactly how many wells are in the field.

There are more than 500 known. The state has no jurisdiction, and few if any records are being kept.

The more than 200 rigs in the field range all over the lot in size and type. All but three are cable-tool affairs, mostly truck-mounted. Rotaries have not worked well so far. Of the three in use, two are air rigs and the third uses mud.

The wells are completed into tanks in about a week from spudding in. The drilling cost runs $3 per foot and wells average $1,500 to drill. Total cost to drill, complete, and equip runs about $6,000.

Casing programs vary widely. Many operators drill to near top of the pay, set pipe and drill into it. Others set as little as 80 ft. of surface casing and produce through open holes below.

One headache . . . Water is a big problem.

Present oil production is about 19,000 bbl. daily with an estimated 50,000 bbl. daily of salt water.

The state is moving in to control the pollution problem resulting from such excess water production. Producers originally were given 30 days to halt putting salt water into the Green River. Some have complied, but the 30-day period was extended for others. Some operators now are building pits to hold the water for evaporation. More are returning it to the producing formation, generally below the oil.

The heavy water flow has created some odd production practices. Producers are running 2 and 3-in. tubing equipped with 3-in. working barrels to handle the large fluid volumes. There are also a number of Reda pumps installed in the field. On the outer fringes, generally to the east, some wells are producing almost 1,000 bbl. of water for each barrel of oil.

In an odd reversal, many wells show an increase in oil output after they have been produced for several months. These wells show high initial water-oil ratios. After being pulled hard, they show a drop in water. Some are making several times as much oil after 6 months' production than they did initially.

Where wells are spaced closely, some are dropping off sharply in oil production. But not in the heart of the best production area, where core drills have shown about 11 ft. of high porosity, water-free pay in the lime.

The field is electrified and nearly all pumps are powered by motors, ranging from 2 to 7½ hp., and averaging 5 hp. In fact, the tank batteries are lighted with flood lamps all night, giving rise to the crack: "It's an old time boom with floodlights."

The oil . . . The crude runs nearly 43° gravity and is highly paraffinic.

It contains only 1½% asphalt, and the wax content is so high that some problems arise on pour point of distillate fuels made from it.

The virgin gasoline cut is relatively low on octane.

All the oil is now trucked out of the field to Louisville at a price of $2.60 a barrel. This is the Illinois basin posted price less cost of trucking to Louisville.

Ashland started buying the Green County crude last May and put in the $200,000 gathering system when the new part of the field opened to the northwest. Ashland now is buying about 17,000 bbl. daily. From its central dispatching point near Greensburg, Ashland sends out one 125-bbl. truck every 10 minutes day and night on the 80-mile run to Louisville.

Ashland has right-of-way men now working the pipeline route and is signing up production on 18-months' contracts throughout the field getting ready for the pipeline project.

Air of a boom . . . The oil fever has turned Greensburg inside out.

For the 2,200 residents of the town, the oil is proving a pleasant and profitable surprise. Vacant offices are filled, restaurants overflowing, and the town's streets crowded with cars bearing strange license plates.

Talk about the tobacco crop and planning the spring planting is being displaced by the latest news from the field and the strange lingo of the oil man.

Strange stories abound.

One hamburger-stand operator on about two city lots drilled three wells in his parking area and sells $1,500 worth of oil and $15 worth of hamburgers daily.

Some folks give this reason for the state stepping in to halt dumping salt water into Green River: The moonshiners had complained the water from the wells was ruining the flavor of their whisky. The state stepped in to protect the quality of its chief product.

Town-lot drilling has hit Greensburg. One home on a 100-by-100-ft. lot has a well in the back yard, one on each side of the house right against windows, and one drilling in front so near the screen door that it can't be shut.

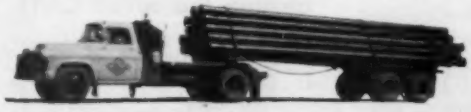
Chief complaint, however, is the truck traffic. The steady stream of trucks carrying oil to Louisville has jammed the roads and reminds natives of an army on the move.

But few townspeople of Greensburg complain too loudly just as long as the boom will keep up.

Congrats and $25 to D. H. CROWELL, 5919 Vickery Blvd.. Dallas. Texas, for this quip.

There's no use fishin' around on pipe purchases . . when Lone Star pipe is so close at hand and so economical in the long run.

Lone Star API casing, tubing and line pipe represent steel pipe at its best. Exacting multiple tests assure the toughness . . the stamina . . the long service that the oil and gas industry demands. Joe Roughneck knows that Lone Star has every step of pipe-making under control . . quality control . . from mining of ore to finished pipe.



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Conservation Men Busy

. . . in five oil states. Industry witnesses a spate of hearings on wider spacing, gas shut-ins, and field rules.

MOVES toward wider spacing and new controls over both physical and economic waste of gas occupied oil men and conservation officials in at least five oil states last week.

The states involved include:

. . . **Arizona,** where oil men are debating a move toward 80-acre spacing proposed in a new set of field rules under consideration.

. . . **North Dakota,** where some operators are pressing for 160-acre spacing.

. . . **Utah,** where most operators in the Aneth area are getting their wells back on production after a shutdown since November 10 to halt gas flaring (see p. 79).

. . . **Oklahoma,** where operators and state conservation officials are taking pressure tests of wells in Ringwood gas field, shutdown since November 20 because of alleged economic waste stemming from low prices.

. . . **New Mexico,** where state conservation officials prepared to hear evidence December 16 on gas flaring in Bisti field (OGJ, Nov. 24, p. 46).

New Arizona rules . . . The 80-acre spacing move in Arizona will get another airing December 16 when a second hearing is held by the state land commissioner on new field rules.

Only minor opposition arose to the spacing proposal in first hearings held in Phoenix before Commissioner Obed M. Lassen early last month. Spacing practices in Arizona currently are based on a 40-acre pattern.

Spokesmen for the majors and larger independent operators supported the proposed 80-acre spacing as a forward step to make Arizona more attractive to oil exploration and development. Supporting the idea were California Standard, Shell, Humble, Atlantic Refining, Sinclair, El Paso Natural, Sunray Mid-Continent, and Pan American.

Several independents opposed the change, saying they favored the present 40-acre pattern or none at all. Prominent among this group was Van D. Bennett, president of Valen Oil & Minerals Corp., Phoenix, who strenuously opposed the spacing proposal.

Bennett in a written statement asserted that Arizona should be encouraging a market for its prospective oil production instead of setting up restrictions on drilling and production. He said the fact that Arizona now has no severe conservation or proration rules is one of its attractions to oil investors.

Bennett said if 80-acre spacing is followed, major operators will take their own time in developing Arizona's oil resources. Real risk capital from other sources will be discouraged from moving into the state, he argued.

The proposed rules in general are similar to those in effect in other oil states concerning drilling, plugging, and production. One big difference is the proposed allowable formula.

The allowable for each Arizona well would be composed of two parts: An economic allowance and an acreage allowance. The economic allowance would range from 12 bbl. daily for pools 3,000 ft. deep to 75 bbl. daily for 15,000-ft. depths. The acreage allowance would be based on feet of net pay and productive acreage assigned to the well.

Commissioner Lassen will take the arguments and proposals under advisement following the December 16 hearing.

More spacing . . . The North Dakota Industrial Commission has under advisement an even more interesting case on spacing.

It has before it requests from oil companies for 160-acre spacing in place of the commonly used 80-acre patterns.

William H. Bowie, petroleum engineer for Hunt Oil Co., testified before the commission that temporary 160-acre spacing granted in North Tioga pool had resulted in doubling acreage under development.

The wider spacing has increased the rate of exploration because of lower-cost incentive, he said. He reported developed acreage jumped from 2,700 acres in August to 5,300 acres, and more locations are being staked.

Bowie asked that 160-acre spacing be made permanent in North Tioga and temporary 160-acre patterns be granted for Rival and South Rival fields.

Gas troubles . . . Excitement simmered down in two oil and gas fields which recently have been hit by shutdown orders.

In the Aneth area, most producers had their oil wells back on production. They had temporary FPC certificates to sell their produced gas to El Paso Natural.

In Oklahoma's Ringwood gas field, operators still were shut in while pressure tests were being completed. The Oklahoma Corporation Commission ordered the shutdown of 225 gas wells for tests to determine if economic waste was occurring due to continued production at low prices (OGJ, Nov. 24, p. 50).

The test data will be presented at a commission hearing in Oklahoma City December 18-19. At that time the commission will decide if economic waste is occurring and whether it should take jurisdiction to fix prices or make new field rules for Ringwood.

The issue could lead to an important test case of how far oil states may go in regulating production and prices.

Wild Wells in Gulf Tamed

. . . but Continental still faces a long and costly job in getting the seven CATC producers back into operation.

THE LAST wild well on the CATC 45-E platform off Louisiana was capped last week.

Salt water and weighted mud, injected into the producing formation through a relief well, killed the flow from No. 7, a four-string completion, to write an end to a dangerous job that took nearly 2 months.

Continental, operator for CATC, now must determine which of the seven wells on the platform can be repaired and restored to production. At least five of them were afire at one time following the explosion October 5 which wrecked the platform and turned the wells loose.

The No. 7 well, most troublesome of the bunch, was killed through a relief well drilled to a lower formation by the big platform Mr. Gus II.

Another platform, the Vinegarroon, had drilled into higher formations in the well, but injection into these zones was not necessary.

A third relief well, drilled by Kermac Rig 46 to kill well No. 5, also proved to be unnecessary. The well died of its own accord.

Three new producers . . . Continental plans eventually to complete the three relief wells.

For the present, work on those

drilled from the Vinegarroon and Mr. Gus II has been suspended. One-well platforms with protectors will be built for all three.

A Continental spokesman said it will take 6 months to 1 year to get all the wells back into production, or drill new wells. Where possible, the holes will be cleaned out and used again.

The inquiry . . . Meanwhile, the cause of the explosion that caused the disaster was still a mystery, at least to the public.

The U. S. Coast Guard sent to Washington a set of findings and recommendations but did not release them to the public.

A seven-member panel, headed by Rear Adm. Carl Olsen, commander of the Eighth Coast Guard District at New Orleans, heard 28 witnesses during 5 days of hearings.

Twenty were survivors of the explosion. Only 2 of the 22 survivors were not heard. Seven men are presumed to have been killed, although only one body was found.

Testimony showed two men had been welding at about the time the explosion occurred. Some of the testimony was conflicting.

Both welders are among the missing. Both were on the main platform where the No. 7 well was being completed.

A Coast Guard spokesman said the inquiry was held to (1) determine the cause of the explosion as far as practicable, (2) determine whether there was any violation of federal law or regulation, and (3) make recommendations on how to avert such incidents.

Atom's Role Growing

. . . as a new tool for chemical industry. Process heat, difficult separations promised by application of fission.

THE ATOM'S role in the chemical industry is getting bigger.

Nuclear production techniques such as solvent extraction and ion exchange can be adapted for processing-plant operations.

Atomic reactors are being developed for chemical synthesis. And nuclear plants which will generate process steam are in the cards.

These and other developments point to a hand-in-glove relationship between the nuclear and chemical industries in the years ahead. This is the conclusion of a panel of experts at the semiannual meeting of the Manufacturing Chemists Association in New York.

The Atomic Energy Commission, for instance, was faced with complex separation problems. As a result, it has done a lot of basic and applied research on both solvent extraction and ion exchange. These techniques are effective in making difficult separations and could be used for chemical operations.

Fission heat . . . An intriguing possibility is the use of fission heat to secure very-high-temperature atmospheres under pressure.

Nuclear heat would be ideal since, like electrical heat, it is generated in a body without combustion. The temperature would be limited solely by the strength of the materials involved.

The Bureau of Mines, as an example, is interested in gasifying coal at 2,500° to 3,000° F. at a pressure of about 30 atmospheres. And the AEC is interested in developing a reactor to operate at this temperature, regardless of its application. Once the reactor is built, the chemical industry will be called upon to propose processes for testing it.

Heat reactor . . . The heat inherent in the fission process is practical for generating process steam.

The fission process will become really competitive if present estimates of steam-production costs turn out to be correct.

This phase of reactor technology has been practically ignored until recently, but the chemists believe it is much closer to reality than the production of steam for making electricity.

These process-heat reactors, which would be built specifically to produce steam, would differ from power reactors in two principal ways.

. . . They would be simpler, since they would be producing low-temperature, low-pressure steam.

. . . They would be smaller, since the volume of steam required for process heat would be smaller than that required for electric-power generation.

Importance of the industry of the process-heat approach can't be overlooked, the panel decided, since about three times as much steam is used for this purpose as is used for generating electric power.

Deal Is Pending

between Sinclair and Texas Pacific. Stock swap sought.

SINCLAIR Oil Corp. has offered to buy Texas Pacific Coal & Oil Co., Fort Worth, in a deal involving about $110,000,000.

Sinclair, which already owns 29% or 1,121,692 of the Texas firm's common shares, wants to exchange one share of Sinclair stock for each 1.55 shares of Texas Pacific.

At Sinclair's present market price, the offer would place a value on Texas Pacific stock of about $40 per share. The offer has been referred to Texas Pacific's executive committee. Sinclair requested a decision no later than January 28.

Sinclair's 29% stock interest in Texas Pacific was acquired in 1956 for about $47,000,000 (OGJ, Aug. 20, 1956, p. 115). The same year, Sinclair beefed up its reserves again by purchasing Southern Production Co. in a $108,000,000 deal.

Texas Pacific has net crude production of about 21,500 bbl. daily in 7 states. About 75% of it is in Texas

Gross income in 1957 was $24,665,000, and net profit was $7,232,000. Common shares outstanding total 3,875,265.

Texas Pacific, one of the oldest corporations in Texas,, was formed in 1888 to mine coal west of Fort Worth. The company entered the oil business in 1917 when it discovered the important Ranger field. Nine years later it quit mining coal.

Sinclair, the seventh largest oil company in the U. S., has assets of more than $1.5 billion. Production in the Western Hemisphere is about 190,000 bbl. daily. Refining capacity is 483,000 bbl. daily.

Coastal Lets More Contracts

COASTAL Transmission Corp. has let contracts for 116 miles of main line on its portion of Houston Corp.'s Texas-to-Florida gas line.

The latest Coastal contracts went to four Texas firms. Brown & Root, Inc., Houston, will construct 11.4 miles of 24-in. main line across Galveston Bay. River Construction Co., Fort Worth, will build the next 105 miles of 24-in. from Galveston Bay to north of Lake Charles, La.

Buddy Sherrod, Inc., Conroe, Tex., was awarded the Natchez River crossing project between Beaumont and Port Arthur. Rosson-Richards Companies, Houston, was awarded the concrete-coating contract for pipe.

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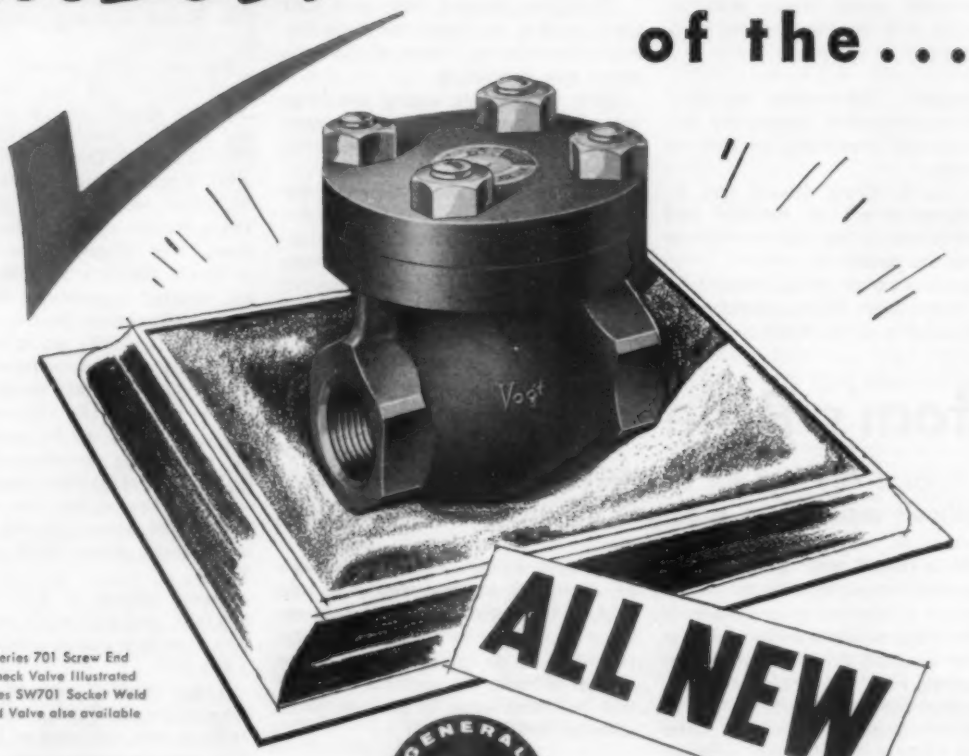

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Record Output Scored

. . . by free world. Biggest gains in Middle East. U. S. also gained, but Canada, Venezuela dropped.

FREE-WORLD CRUDE production was pushed past the 16-million-barrel-daily mark for the first time in September by record output outside the United States.

Another milestone also was reached as foreign output hit 9 million barrels daily for the first time, with the last million barrels added in just 2 years despite a Middle East crisis and a business recession.

The new records were due to gains in the Middle East where Kuwait, Iran, and Iraq chalked up the highest production in their history, and where Saudi Arabia had the best month in over a year.

The U. S. industry picked up, too, passing the 7-million-barrel-daily level for the first time since tanker traffic returned to normal through the Suez Canal last year. Venezuela and Canada were the only major oil-producing countries not to share in the gain. Venezuelan output dipped 63,000 bbl. daily, and its 9-month average was down more than a quarter-million barrels from 1957.

TREND OVER THE LAST YEAR

	Western Hemisphere less U.S.	Middle East	Total Free World outside U.S.
1957			
September	3,758.6	3,977.1	8,517.4
October	3,758.8	3,878.9	8,435.5
November	3,654.7	3,704.2	8,412.4
December	3,661.7	3,973.6	8,412.4
1958			
January	3,680.4	4,034.0	8,465.6
February	3,798.7	4,057.6	8,662.1
March	3,672.6	4,243.0	8,631.3
April	3,613.5	4,109.2	8,528.0
May	3,582.9	4,087.8	8,468.2
June	3,678.0	4,156.8	8,654.2
July	3,777.0	4,247.2	8,832.6
August	3,828.4	4,334.0	8,971.5
September	3,753.6	4,530.3	9,099.0

World-Wide Crude Production: Daily Average in Thousands of Barrels

Country—	Sept. 1958	Aug. 1958	Sept. 1957
Western Hemisphere			
Argentina	92.7	92.7	94.8
Bolivia	9.5	9.5	10.4
Brazil	57.4	56.3	24.0
Canada	431.0	445.5	479.0
Chile	15.7	15.7	12.4
Colombia	133.8	132.0	125.4
Cuba	0.9	0.9	1.0
Ecuador	8.2	8.2	8.1
Mexico	263.0	263.0	241.1
Peru	54.1	54.1	52.9
Trinidad	104.2	103.8	96.3
Venezuela	2,583.1	2,646.7	2,613.2
Total	3,753.6	3,828.4	3,758.6
Europe			
Austria	51.6	52.2	58.6
France	27.8	27.6	26.7
West Germany	88.0	88.0	78.6
Italy	33.6	29.5	32.6
Netherlands	31.1	31.1	31.4
Turkey	6.5	6.5	6.6
United Kingdom	1.7	1.7	1.7
Yugoslavia	9.2	9.5	8.0
Total	249.5	246.1	244.2
Middle East			
Bahrain	43.3	40.5	34.2
Iran*	909.0	884.0	771.0
Iraq†	800.8	790.6	591.4
Israel	1.2	1.2	1.2
Kuwait	1,442.0	1,378.7	1,283.6
Neutral Zone	80.0	80.0	85.6
Qatar	174.0	169.0	155.1
Saudi Arabia	1,080.0	990.0	1,055.0
Total	4,530.3	4,334.0	3,977.1

Country—	Sept. 1958	Aug. 1958	Sept. 1957
Other Asia			
British Borneo	106.0	106.0	115.5
Burma	10.5	10.5	8.7
India	8.5	8.5	7.7
Indonesia	325.0	325.0	334.4
Japan	7.0	7.0	6.6
New Guinea	5.4	5.4	5.9
Pakistan	5.9	5.9	6.0
Total	468.3	468.3	484.8
Africa			
Algeria	11.8	11.8	0.2
Angola	2.0	2.0	.....
Egypt	65.3	62.7	47.4
Gabon	10.1	10.1	3.6
Morocco	1.5	1.5	1.5
Nigeria‡	6.6	6.6	.....
Total	97.3	94.7	52.7
Free World			
Foreign	9,099.0	8,971.5	8,517.4
United States	7,099.0	6,939.0	6,887.0
Total	16,198.0	15,910.5	15,404.4
Communist Countries in Soviet Orbit			
Romania	235.0	235.0	224.0
Russia	2,230.0	2,230.0	2,000.0
Others	60.0	60.0	50.0
Total	2,525.0	2,525.0	2,274.0
WORLD TOTAL	**18,723.0**	**18,435.5**	**17,678.4**

*Includes estimated 5,000 bbl. daily from Naft-i-Shah field not operated by consortium companies. †Includes estimated 3,600 bbl. daily from Naft Khaneh field, operated until December by British Petroleum Co. ‡Test production.

Figures are from reliable industry reports or government sources. Estimates are made where complete reports are lacking.

EQUIPMENT CONVOY starts trip from Tulsa to Houston port, with Argentina as its final destination.

Argentine Drilling Starts in 30 Days

• Equipment on its way to launch big Latin America development program.

A TARGET DATE of January 1 is set by Loffland Brothers Co., Tulsa, to spud its first development well in Argentine's Comodoro Rivadavia area.

It will be the first of at least 100 wells Loffland Brothers will drill for Pan American International (Indiana Standard), which has a $60-million contract with Yacimientos Petroliferos Fiscales, Argentine Government oil agency (OGJ, Aug. 4, p. 70).

It is part of an agreement Argentina has with a group of U. S. companies for an $800-million, 6-year development program aimed at making the country self-sufficient in oil.

Under its 15-year contract, Pan American will spend $60 million developing a 1,545-sq.-mile area in the northern part of Comodoro Rivadavia field. The area includes three proved and semiproved structures in Chubut and Santa Cruz.

Pan American plans to have 50 wells drilled the first year. The company has agreed to drill a minimum of 100 wells. If the program achieves good results, however, the number may far exceed that.

Big operation . . . Loffland Brothers will put 10 new rigs to work in Argentina.

ARGENTINE-BOUND diesel-powered truck is loaded on ship at Houston port.

That means one of the biggest movements of equipment ever undertaken in the history of the oil business. The rigs—seven drilling units and three completion units—and other equipment are being moved in three shipments to Argentina by Mid-Continent Supply Co.

The first shipment of three rigs left the Houston port November 6 aboard the S.S. Cambridge and is due to arrive in Argentina this week.

A second shipment departed last week. It has a December 20 arrival date. The third shipment leaves Houston December 12, arriving in Argentina January 1.

Shooting for the January 1 target,

Loffland Brothers already has an advance party of 10 in Argentina. Robert W. Wire, president of the firm, was in Argentina last week, checking on the preliminary operations.

The drilling firm will have 60 Americans in Argentina to handle the management, supervisory, and other major jobs in the development program. The company also will employ about 250 Argentine nationals.

John Rundle, vice president of foreign operations for Loffland Brothers, said housing facilities are limited in the town of Comodoro Rivadavia, but the Americans probably will have apartments there.

Equipment . . . The seven deep rigs being shipped for Loffland Brothers were designed and equipped for operation in Argentina by Mid-Continent Supply.

They were manufactured in Tulsa by Unit Rig & Equipment Co. Each is equipped with a 126-ft. Lee C. Moore telescoping mast. Although capable of drilling to 9,500 ft., the rigs will be used to drill to about 6,000 ft. in the Argentine development program.

Crude Line Finished

to supply oil to expanding and new German refineries.

THE WEST GERMAN refining industry is opening a new era this month with the completion of the Wilhelmshaven-Cologne crude pipeline.

Initial deliveries through the 230-mile, 28-in. system are expected to start moving this week.

The line will at first handle up to 200,000 bbl. daily with one remote-controlled pumping station. Three more stations to be added next year will boost capacity to 500,000 bbl. daily. Iranian crude will be the first to be shipped through the system.

Two refineries will start taking crude immediately from branch lines. They are the 18,000-bbl. plant of Gewerkschaft Edoel Raffinerie-Emsland at Lingen-Holthausen, and the 22,000-bbl. plant of Scholven-Chemie AG at Gelsenkirchen-Buer.

Owners of the operating company, North-West Oil Pipeline Co., are Esso AG, British Petroleum, and six local firms. BP has just broken ground for a 100,000-bbl. plant at Dinslaken, 15 miles north of Duisburg. The refinery will take crude from the new line.

Esso is completing a 75,000-bbl.-daily refinery at Cologne this year. This plant also will be supplied by the new line. It will be expanded to 160,000 bbl. daily later.

Perez de la Cova Loses Post

. . . of mines and hydrocarbons in Venezuela. Change comes as junta head resigns to run for president.

HIS OUTSPOKEN defense of a free enterprise oil industry for Venezuela last week cost Dr. Carlos Perez de la Cova his post as minister of mines and hydrocarbons.

The diminutive engineer-diplomat was replaced by Julio Diez, a lawyer-banker-politician with no previous experience in the oil industry or in government circles connected with oil.

The change in the top post of the highly important Venezuelan ministry came in a switch of temporary cabinets brought about by the country's presidential campaign.

When Rear Admiral Wolfgang Larrazabal resigned as head of the junta de gobierno to become a practicing candidate for president of the country, the entire cabinet submitted resignations. Only three were accepted.

Dr. Numa Quevedo, minister of interior relations, left the cabinet to take part in Larrazabal's campaign; he was replaced by Augusto Marquez Canizales. Andrew Sucre, minister of public works, was replaced by Luis Baez Diaz.

Unpopular beliefs . . . The junta which has ruled the country since dictator Marcos Perez Jimenez was overthrown gave no reason for replacing either Perez or Sucre, but no one in the oil industry needed an explanation for the Perez departure.

The minister of mines, who took over the job in the aftermath of the Venezuelan revolution less than a year ago, has been swimming against the rising political tide.

All the country's rival politicians have demanded changes in the country's oil policy to give Venezuela a bigger share of oil revenues. Most advocate a national oil company.

Perez de la Cova doggedly defended Venezuela's present oil policy as the soundest system for the country.

He made repeated references to the strides made by Venezuela's private oil industry. His comparisons of the healthy Venezuelan oil industry to the faltering, state-strangled industries of other Latin American countries did not endear him to Venezuela's nationalistic politicians.

Change no surprise . . . Oil circles in the country admired the minister's stand for what he believed in, but they have realistically conceded for weeks that his days were numbered.

It was assumed he would be replaced as soon as a new president is elected early in December. Larrazabal's resignation to become a candidate put Dr. Edgard Sanabria in as new president of the temporary junta and triggered the naming of a new cabinet.

Last week when Diez, former governor of Venezuela's federal district, took over the mines industry, the junta said there was no "adverse judgment" intended concerning the departing ministers.

"On the contrary," Ignacio Irabarren Borges, junta secretary, said, "the junta wants to publicly testify to the loyalty and devotion of these men to the cause of liberty and democracy, sparing no energy or time."

Haifa Refinery Sold

to private interests as BP and Shell abandon Israel.

THE WORLD'S major oil companies broke their final ties with Israel last week as British Petroleum and Royal Dutch - Shell sold the 87,000-bbl. Haifa refinery.

The marketing facilities of the two big companies were sold last April to the same private interests. The majors said their operations were no longer commercially attractive (OGJ, July 29, 1957, p. 125).

The refinery is being bought by Paz Oil Co., now Israel's largest marketer. Paz is backed by Iwol Investments, Ltd., a holding company formed in April by Isaac Wolfson, London industrialist, to buy the marketing setup.

The Haifa refinery has operated at only about 24,000 bbl. daily since 1948, when Arab countries cut the pipeline which once supplied it with Iraqi oil.

A newly completed 250-mile pipeline from Elath on the Gulf of Aqaba has been supplying the refinery since it was completed. Throughput of this line is limited because the Elath-to-Beersheba section is only 8-in. The remainder of the line is 16-in.

The refinery sale was revealed just 2 days after Israel announced the completion of a 6-in. products line from Haifa to Tel Aviv.

The $4½ million line, with an initial capacity of about 10,400 bbl. daily, goes into operation in December.

ITALIAN'S platform starts 10,000-mile voyage to the Persian Gulf.

Persian Gulf Activity

. . . due faster pace. Pan American, Italians, and Japanese have drilling programs lined up off Iran or Neutral Zone.

PAN AMERICAN International Oil Co. expects to spud in its first wildcat on its Persian Gulf concession off Iran about next July 1. It will be a 16,000-ft. test.

Pan Am has let a drilling contract to Seacat Marine Drilling Co., S.A. (Persian Gulf). The firm is a combine of Southeastern Drilling Corp., Dallas; Turnbull & Zoch Drilling Co., Corpus Christi; Frank G. McClintock, Tulsa; and Contracting & Trading Co., Beirut, Lebanon.

Seacat will dispatch a Delong-type offshore barge to Iran about the first of the year. It is capable of drilling in 150 ft. of water. The journey will take about 4 months, the rig arriving in Iran around May 1. Seacat will take another 60 days or so to get set up in Iran prior to start of drilling.

Seacat will maintain a large warehouse at Khorramshahr, Iran, with the mud, cement, and other supplies needed to sustain operations. Cargo boats working out of Khorramshahr will service the drilling operations, most likely supplemented with helicopter service.

The drilling equipment on the platform is basically diesel electric with a depth capacity of about 18,000 ft.

Other activity . . . Another mobile drilling platform is heading for Persian Gulf waters.

The $1-million unit was built by R. G. LeTourneau, Inc., for the Italian Government. It will test the acreage off Iran in a joint venture with National Iranian Oil Co. SAIPEM, a subsidiary of Ente Nazionale Idrocarburi, the Italian Government oil agency, holds the Italian interest in SIRIP, the joint venture with the Iranian Government company (OGJ, June 23, p. 89).

The 1,000-ton unit (photo) is shown headed down the Mississippi for New Orleans and the first step before ocean tugs took over for the tow across the Atlantic, through the Mediterranean and Suez Canal. At the end of the 10,000-mile voyage, which will take about 3 months, it will be outfitted with a derrick and other equipment. The platform's triangular hull is 120 by 115 ft. and is 13 ft. deep. Three electrically powered, 120-ft. legs raise and lower the platform at a rate of a foot per minute. The platform will be operated with a tender, a converted LST.

Arabian American Oil Co. also is using a LeTourneau platform in the Persian Gulf (OGJ, May 19, p. 117).

A joint French-British company has a DeLong-type barge operating in Persian Gulf waters. Also, Reading & Bates Offshore Drilling Co., Tulsa, is sending its mobile platform, the C. E. Thornton, to the area to drill off the Neutral Zone for Arabian Oil Co., the Japanese firm (OGJ, Nov. 17, p. 150). The C. E. Thornton will start its 110-day voyage from Orange, Tex., on December 23.

Test in Guatemala

to be drilled soon on block held by four U. S. companies.

THE FIRST DEEP test has been scheduled by a group of American oil companies on a 67,000-acre block in the eastern part of Guatemala.

Standard of California, through its Guatemalan subsidiary, Cia. Guatemala California de Petroleo, will be operator for itself, Bandini Petroleum Co., and Pauley Petroleum, Inc.

The 7,000-ft. test will be drilled near the mouth of the Rio Dulce on an anticline nearly 10 miles long. The structure was discovered and mapped by surface geological work. This work was supplemented by aerial magnetometer and marine seismic survey in the bay east of the Livingston block.

Santa Fe Drilling Co., Los Angeles, has the drilling contract and is shipping a rig from Ecuador for the test.

Another test is slated in neighboring British Honduras where Bandini holds an interest in about 2,000,000 acres. Phillips Petroleum Co. is getting ready to spud a 10,000-ft. well there on the Punta Gorda structure, about 20 miles from the Livingston wildcat in Guatemala. It will be the first well drilled in southern British Honduras.

Papua Drilling Rights Asked

TWO INDEPENDENTS are trying to jump into Papuan exploration play, where less than a month ago international companies feared to tread.

Camelot Nominees Pty., Ltd., and New Guinea Gold & Petroleum Development have applied for drilling rights in the Australian part of New Guinea.

The move followed in the wake of a 1,000-bbl. discovery at Puri in a program supported by Stanvac, British Petroleum, and a local firm, Oil Search, Ltd.

Camelot is asking for rights on 9,500 sq. miles. The firm is 50% owned by Murphy Corp. New Guinea Gold has applied for 1,650 sq. miles near the Dutch New Guinea border, where it held a license which was given up earlier this year.

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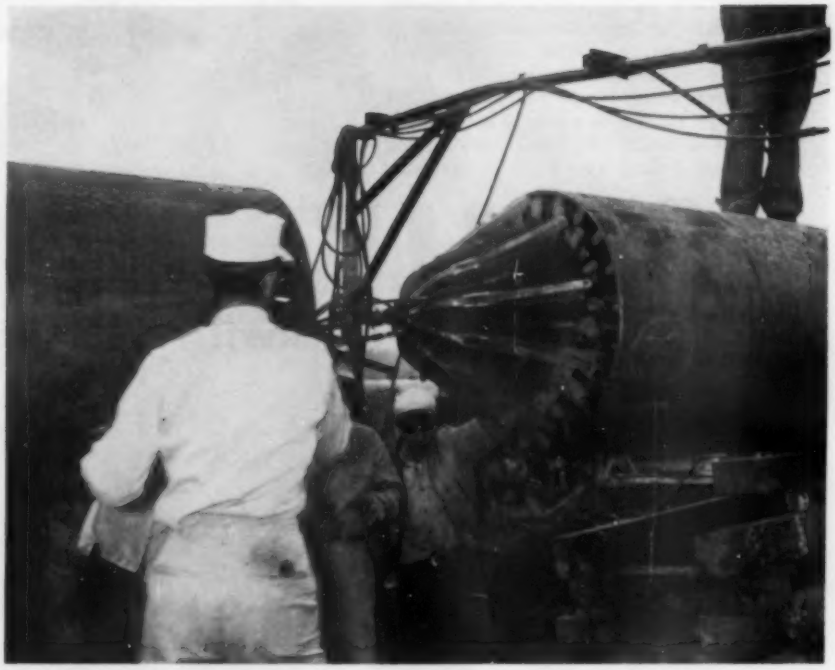


PNEUMATIC LINEUP CLAMP rounds out "egged" pipe ends and permits rapid lineup of pipe joints, which is a key to spread progress.

490 miles of 36-in.

BY GENE KINNEY
Assistant Pipeline Editor

THREE experienced contractors are proving that, given enough manpower and heavy equipment, you can lay 36-in. pipe about as fast as 30-in.

R. H. Fulton, Williams Brothers Co., and Contracting & Material Co. were awarded contracts to build 490 miles of 36-in. loops and 21 miles of 26-in. on the Fritch, Tex.-Chicago system of Natural Gas Pipeline Co. of America. This was the greatest mileage of 36-in. to be laid in a single project.

Contractors kicked off around the middle of August, with a December 1 deadline. Using five spreads (Fulton and Williams Brothers have two each), they will complete on time. The looping will give Natural 100,000 M.c.f. daily in new capacity and put it in a good position for future expansion. It will be a big start on a third line to supplement the complete 24 and 26-in. lines now in operation, serving Natural's parent, Peoples Gas Light & Coke Co., and other distribution companies in Iowa and Illinois market areas.

Everything about the job is big. The pipe, being the largest diameter in high-pressure transmission service, required a ditch to match. The company specified 3½ to 4 ft. of cover, rather than the normal 2½ to 3 ft., meaning an even bigger ditching job. Much of the line crosses wheat, maize, and corn fields, requiring the line to be buried below plow depth.

Contractors employed twice as many welders as are usually found on a 30-in. job, and some wanted more welders. Two spreads put on an extra pipe gang to boost production.

Because of the size of pipe, bends were restricted to 12° or less. This in turn required more joints to be bent and extra grading on hills to stay within bending specifications. Extreme care was needed to avoid wrinkling the pipe.

The biggest sideboom tractors made were used for dope, lowering in, and sometimes tie-in and to cradle the road-boring machine. Caterpillar 583's were found in great numbers in these gangs along with Allis Chalmers HD21's and International TD24's. Several D9's were on right-of-way gangs which had to move an abnormal amount of earth.

M. J. Paul, chief engineer, and Joe Thompson, construction superintendent, made weekly inspection trips to all spreads, traveling by helicopter.

Schedules 1 and 2—R. H. Fulton

Schedule 1 included 21 miles of 26-in. and 101.8 miles of 36-in. between Fritch and the Kansas line, and Schedule 2 was 104.91 miles of 36-in. in Kansas. As both Fulton spreads traversed similar terrain, only Schedule 2 was visited.

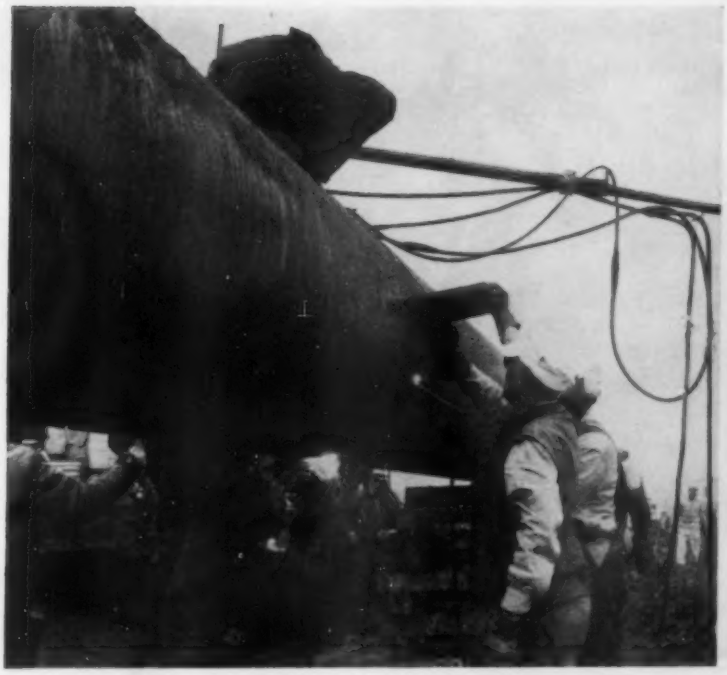
Lineup is critical in the speed of laying large-diameter pipe, and contractors used a Perrault pneumatic internal lineup clamp for this operation. The power clamp, which rounds out "egged" pipe ends rapidly, permits faster lineup and reduces hammering to eliminate high-lows.

Fulton had 10 pipe-gang welders, which was standard for all spreads. There were four making stringer bead, compared with three or four used on 30-in., and six on hot pass, which compares with four often used on 30-in. There were 15 firing-line welders, although the welding foreman considered the ideal number to be 22, with 2 spelling off. On its best day the pipe gang lined up 223 joints. The pipe gang generally made 6,000 to 8,000 ft. per day. The welders averaged 10 to 12 welds a day.

The contractor owned all equipment on the spread, including the 300-amp. welding machines to make stringer bead and hot pass and 250-amp. machines elsewhere.

The Texas and Oklahoma panhandles and western Kansas winds made dust a problem. During dry weather water wagons wet down the right-of-way on the firing line and in the dope gang. "Mule-training" on the firing line was a further step to keep down dust. Instead of the rear machine moving around all others, a tow tractor pulled the first machine to a welding location, then pulled the second one to a position behind him.

The X52 0.344-in.-wall main-line pipe was coated with asphalt, reinforced with glass, and wrapped with



PIPE GANG runs stringer bead on R. H. Fulton spread through a marshy section following a rain in western Kansas.

DOUBLE DITCHING is employed on Fulton spread, with sloper to make ditch stand up.

pipe laid at record speed

kraft paper on the suction side of compressor stations. On the hot discharge side, pipe was coated with coal tar and wrapped with glass and paper.

The dope gang worked in the afternoon, leaving the coated and wrapped pipe on skids overnight. The same crew lowered in the next morning, using identical personnel except for paper latchers and kettle firemen. The same foreman ran both jobs, an arrangement which the company liked because it fixed responsibility on one supervisor. Early trouble in getting an even coating was solved by running the machine in third instead of second gear.

Cleveland 320's made the ditch for all spreads, with a 51 Buckeye being used on one spread. Fulton used a ditcher with a conventional 30-in. wheel to cut a pilot ditch 52 in. deep and a second one with a large wheel and buckets fabricated in the contractor's shop to deepen to 82 in. Other contractors used three ditchers leapfrogging.

The Fulton spread, under Supt. Hubert Glenn, with Ralph E. Peterson, chief inspector for the company, had an efficient tight operation with only 8 miles from right-of-way to backfill.

Schedule 3—Williams Brothers

Williams Brothers had the biggest spread on the project, some 415 men, working on 106.0 miles in Kansas and Nebraska comprising Schedule 3. There were 47 welders on the spread, which had two pipe gangs. The small pipe gang, with two bead hands and two or three on hot pass, got sections and as much of the main line as possible. It made all transition welds from 0.344-in.-wall main-line to 0.4375-in.-wall road-crossing pipe without a transition ring, using mechanical external and internal clamps on lineup. With road-crossing bottlenecks out of the way, the main pipe gang didn't have to slow down.

The main pipe gang had 10 welders, the firing line 23, and 10 were on tie-ins, fabrications at stations, and valve installations. The two pipe gangs generally made 9,000 to 10,000 ft. per day, averaging 240 to 250 lineups, and some days over 300 lineups with more than 2 miles of pipe laid. The extra pipe gang—or half a gang, actually—boosted production about 35%, the contractor estimated.

In one very choppy section in Nebraska, the bending crew made 135 bends with a Cinch bending machine in a single day. Three ditching machines were used to cut the 8-ft. ditch in a single pass. Slopers on the ditcher gave an additional 2 ft. of width at the top, helping to make the ditch stand up. Some blasting was done on a rocky section in Kansas, where five back hoes and a D9 equipped with a rooter were used in the ditch gang.

Both Williams Brothers spreads were rig jobs with 200-amp. Lincoln machines in the firing line. Caterpillar Twin-Arc 300-amp. machines were on the pipe gang.

River crossing . . . A major crossing of Little Blue River was made near Beatrice, Neb. Some 6 weeks were spent in installing the 1,200-ft. crossing. The river, normally 2 ft. deep, flooded twice during construction. The channel was diverted to permit sand points to lower the water table, then the ditch was dug with a drag line.

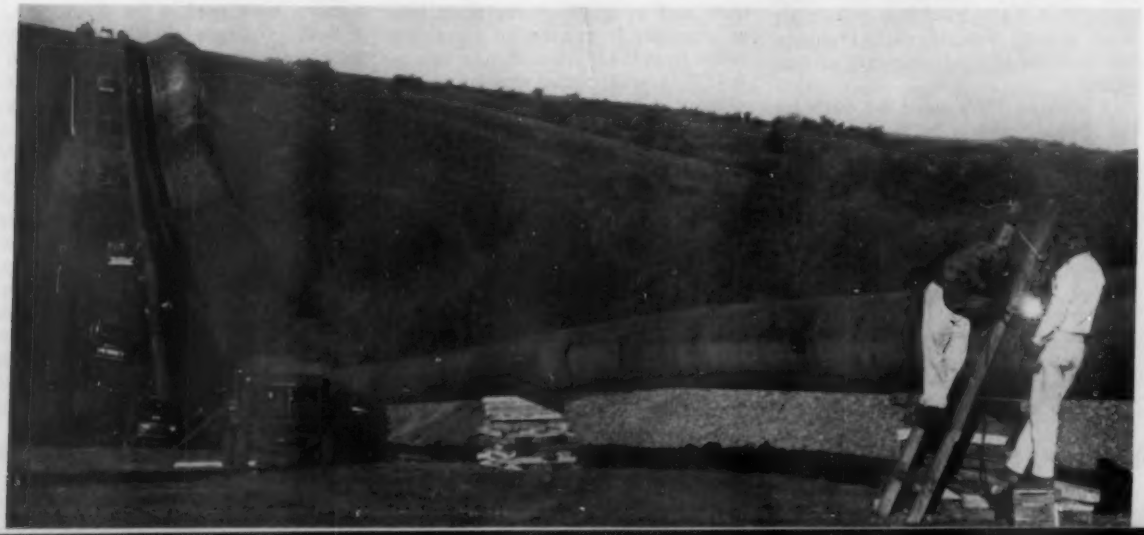
The sand bottom, which erodes bad-

SEVEN-DEGREE BEND is made by vertical machine. Maximum bend was 12°.

SMALL PIPE GANG was used by Williams Brothers out front to get road crossings.

LOWERING-IN tractors tilt under weight as section is laid in the ditch.

FIRING LINE on Schedule 4 makes 10 to 14 welds per day per welder over hilly Iowa terrain.



ly, was cut deep enough to provide 8 ft. of cover, 3 ft. more than normal to allow for extra washing. Some parts of Natural's original lines of the 24-in. system were exposed at the crossing.

Set-on clamps weighing 6,300 lb. each at 9-ft. centers were attached to the pipe at the Little Blue and Big Blue crossings. Big Blue was much simpler to cross. After the ditch was clammed out, pipe was floated in, weights were clamped on, and the pipe was sunk. Dredging is planned to place the pipe under the stream bed at the specified elevation.

In the Big Blue River bottom, three clams worked with the lowering-in crew, cleaning out mud which continually sloughed off the bank. Lowering in followed about 200 ft. behind the clams to get the pipe into the ditch before it was lost.

G. E. Wagner was chief inspector over Schedule 3 and Harlan Evens was spread superintendent. Jerry Nash was superintendent over 3 and 4 for Williams Brothers.

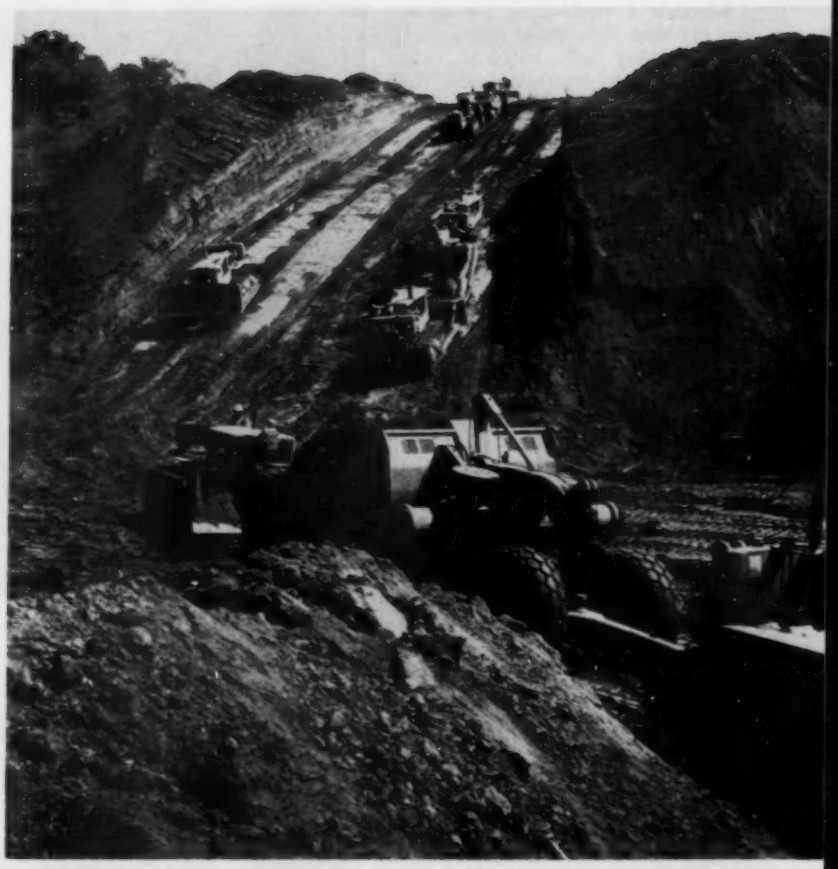
Schedule 4—Williams Brothers

Schedule 4 crossed considerable rolling terrain on its 99.6-mile route across Iowa farm land. On the day construction was observed right-of-way made 13,000 ft., ditching 5,000, bending 5,200, laying 5,700, welding 7,100, coating and wrapping 7,000, and lowering in 6,000 ft.

The pipe gang had been getting 7,500 ft., but on this day there were 32 short "pups" which cut production. Lineup was slowed by choppy terrain, reflected in the number of bends—130—made on that day. With one pipe gang, progress ranged from 150 to 200 joints per day, with 34 welders, including 10 on the pipe gang, 14 on the firing line, and 10 utility. Maximum day was 240 joints.

Halfway through the job another half gang was put on to speed progress. On transition welds, one welder with his own rig hangs back and runs an inside bead.

A regular lowering-in crew was working, supplemented by the dope gang, which lowered in during the morning and doped in the afternoon.



GRADING CREWS of Contracting & Material move 20-yd. loads in scrapers pulled and pushed by D8 and D9 tractors.

SAND POINTS pump water out of ditch near Mississippi River . . .

INTO LAKE over spoil bank.

Schedule 4 made 15 stream crossings but none were major rivers.

The rolling hills required extra grading. The right-of-way gang had 11 bulldozers, including a D9 with a rooter. Where earth moving was excessive right-of-way was pushed to keep ahead of ditching. Erosion terraces were built on this section and others where specified and breakers were installed at terraces in sections which have severe drifting snow.

A. P. Gillaspy was chief inspector of Schedule 4 and Earl Saulsman was spread superintendent.

Schedule 5—Contracting & Material Co.

Over half of the 80.5 miles of Schedule 5, from 10 miles west of Muscatine, Iowa, to near Princeton, Ill., had saw-tooth ridges and mud which hampered the 370-man spread under Supt. Art Fry and Chief Inspector W. M. Satterwhite. Both were convinced this was the roughest part of the entire project.

These 40 and 50-ft. ridges, extending east from the bluffs overlooking the Mississippi River, had to be cut back to keep bends within the allowable 12°. Some 250,000 yd. of dirt was moved by a crawler tractor-scraper fleet. Dirt generally had to be hauled more than 200 ft. and piled atop ridges for drainage purposes, then replaced after the line was in the ditch.

Grading crews worked two 10-hour shifts. They opened a 75-ft.-wide path across ridges and filled in the cuts later. Most of the dirt was moved with four D8 tractors pulling scrapers pushed by three D9's and a D8.

The pipe gang, using four 250-amp. Lincoln arc welders on stringer bead and two 300-amp. Caterpillar Twin-Arc welders on hot pass, made 6,000 to 8,000 ft. a day. The pipe gang got 169 lineups, which was below average, the day it was visited. Besides 10 welders in the pipe gang, there were 19 on the firing line and 10 utility welders.

Through the saw-tooth ridges, over half the joints had to be bent for a period of several days. Dropping off the Muscatine bluffs to the Mississippi, going was even slower through the river bottom for about 9 miles. Lowering in here proceeded in a manner similar to the Big Blue River bottom, although some stretches were much worse.

On the west bank of the river the line crossed a lake 1½ ft. deep and 1,500 ft. across. An elevated road was built across the lake to support heavy equipment. The fill was made from sand dug out by a back hoe working on 20-ft. 8 by 8 timbers. The lake was drained by pumping and a well-point system. Water was pumped through the 36-in. line to the Mississippi. Through this section 465 river weights of 6,300 lb. each and 62 Chance anchors were attached to the pipe to keep it from floating to the surface in the mud.

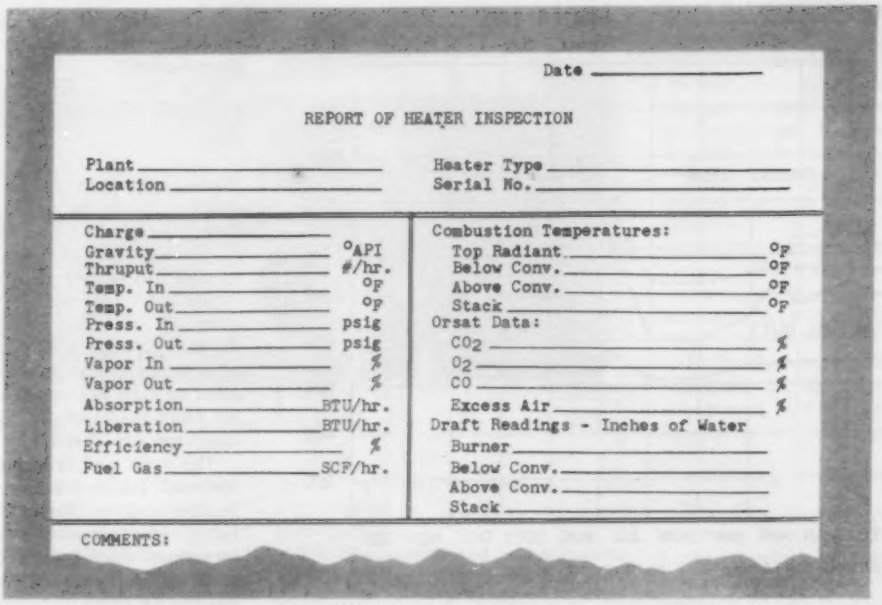
The I & M Canal, connecting the Illinois and Mississippi rivers, was crossed near Sheffield, Ill. The 420-ft. canal was dammed up and the water pumped out to install the crossing.

CLEANING AND PRIMING operation requires heaviest sidebooms for cradling and catchoff.

COATING and WRAPPING is done with coal tar, glass, and paper, also using heaviest tractors (583's in this case).

Acknowledgment

The assistance of D. C. Palm general superintendent of pipelines, Natural Gas Pipeline Co. of America, and the chief inspectors in preparing this article is gratefully acknowledged.



Date _____

REPORT OF HEATER INSPECTION

Plant _____ Heater Type _____
Location _____ Serial No. _____

Charge		Combustion Temperatures:	
Gravity	°API	Top Radiant	°F
Thruput	#/hr.	Below Conv.	°F
Temp. In	°F	Above Conv.	°F
Temp. Out	°F	Stack	°F
Press. In	psig	Orsat Data:	
Press. Out	psig	CO_2	%
Vapor In	%	O_2	%
Vapor Out	%	CO	%
Absorption	BTU/hr.	Excess Air	%
Liberation	BTU/hr.	Draft Readings - Inches of Water	
Efficiency	%	Burner	
Fuel Gas	SCF/hr.	Below Conv.	
		Above Conv.	
		Stack	

COMMENTS:

TYPICAL REPORT FORM shows data needed to insure a successful heater inspection.

How to inspect and maintain

FIRED HEATERS

Here's a four-step program that assures safe operation

BY PETER von WIESENTHAL
Petro-Chem Development Co.

FIRED-HEATER inspection must be designed primarily to assure safe operation at all times. This requires the implementation of a program consisting of four basic steps:

- Regular inspection during operation.
- The elimination of potentially dangerous operating conditions.
- A regularly scheduled shutdown and detailed mechanical inspection.
- The repair or replacement of all components that do not meet rigid minimum standards.

The first and second steps are intended to minimize normal mechanical deterioration during operation and to avoid short-term failures resulting from serious heater-malfunctioning. The third and fourth steps fall into the more conventional pattern of accepted inspection procedure.

It is important, however, for purposes of complete and effective inspection that equal emphasis be placed on all four steps of the program.

Paper presented at ASME petroleum mechanical engineering conference, Denver, 1958.

Maintenance is important . . . The components of any industrial plant require periodic inspection and certain preventive maintenance in order to avoid eventual breakdown. This is particularly true of fired heaters in refinery or gasoline-plant service.

As specialized equipment needing specialized attention, heaters encompass a wide variety of materials and vary greatly in their design features. Two comparable furnaces engineered to the same set of specifications and for the same duty may bear no physical resemblance to each other and consequently their operating and maintenance problems also will vary widely.

A further characteristic of fired heaters is the lack of any clearly defined limit of operability. In this respect they differ markedly from certain other components such as pumps or compressors. Restricted fuel supply or furnace draft are perhaps the only decisively limiting factors, and in most well-designed heaters the draft loss is not controlling.

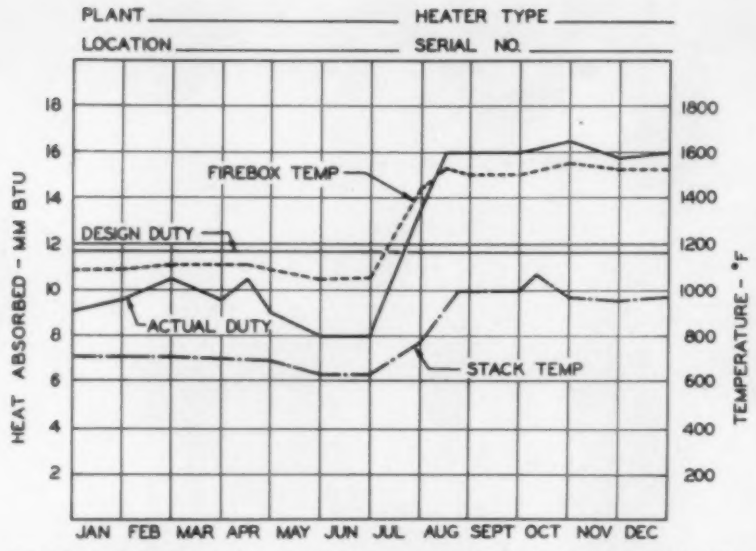
Therefore, in the absence of criteria which arbitrarily limit furnace firing rates, excessive loading or improper operation frequently occurs. The result is accelerated deterioration of furnace components, greatly increased maintenance, and in extreme cases destructive and dangerous equipment failure.

The basic function of inspection and maintenance on fired heaters is to keep the equipment operating safely throughout the scheduled on-stream cycle. To this end a sound inspection program of clearly defined scope and responsibility is needed.

The Inspection Program

A successful inspection program must function during the entire operating cycle of the heater. A continuing effort going considerably beyond periodic mechanical inspection is required.

Unlike pressure vessels or plant piping where some degree of close visual inspection or nondestructive testing is possible during operation,



HEATER OPERATING DATA may be better understood if plotted as a function of time.

the most critical components of fired heaters do not lend themselves to any type of measurement while the unit is running.

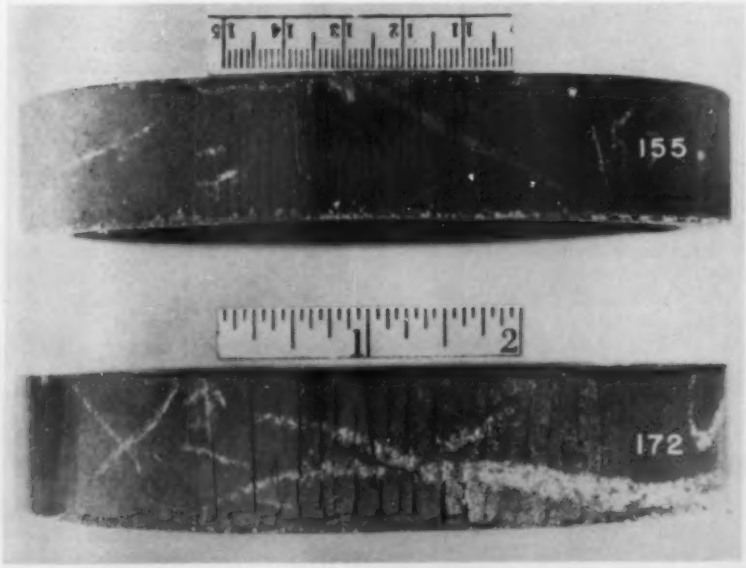
The inspection program, in order to remain effective during the on-stream cycle, must rely almost entirely on observation of the heater operation. The information thus obtained, when related to a background of previous experience, can be used as an indication of the probable heater condition.

This method, though indirect, is probably the surest approach to a workable safety program and the prevention of heater failures during operation. In addition it is the most practical approach for anticipating major heater repairs and making adequate preparations in sufficient time to avoid protracted and costly delays at shutdown.

It is suggested that a regular monthly inspection be performed on each heater while it is in operation. The inspection should include the following:

1. A visual check of the heater interior and exterior.

2. A record of all operating information available on the date of inspection as well as a review of the operating log for intervening weeks.



SLIGHTLY CRAZED SURFACE on tube is indication of scale cracking, associated with metal creep.

3. A check on the operability of all heater instrumentation, including thermocouples.

4. A brief report covering the information obtained during the inspection.

Visual inspection . . . This should concentrate on the appearance of the tube coil and refractory surfaces. Good heater design generally calls for enough observation doors to permit a major part of the refractory and tubes to be seen from outside the firebox. Special attention should be paid to any signs of flame impingement or tube hot spots, and their exact locations carefully recorded on a diagrammatic sketch.

The stack and breeching should be observed for any indication of overheating and, in the case of sour-gas firing, for corrosive attack. All observations which indicate anything unusual should be noted, giving as much descriptive detail as possible. It is understood that of necessity these data must in large part be qualitative.

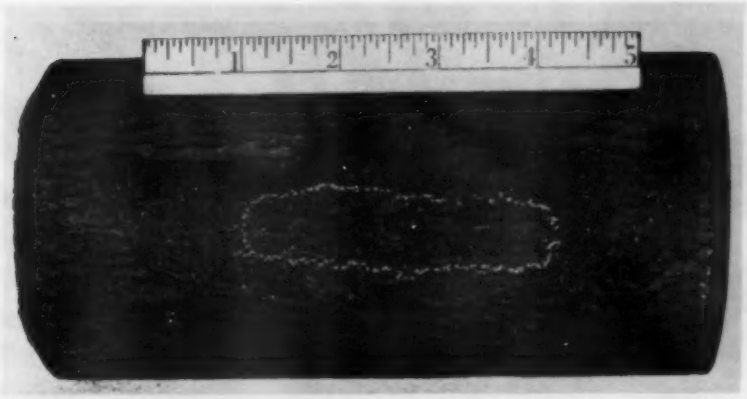
Nevertheless, quantitative estimates giving the extent of cracks in refractory walls, degree of tube bowing, and size of hot spots should be made whenever possible.

Inspection record . . . The heater operating data collected during the inspection must include enough flow and temperature information to permit calculation of the furnace duty. In the case of multipass heaters, the outlet temperature of each pass must be checked. Firebox and flue-gas temperature should be measured. The fluid charge pressures in and out, and particularly fuel-gas pressure (at the burner), are important.

Draft readings are needed at the top of the radiant firebox to guard against the possibility of a pressure condition in the heater. Orsat data on the flue gas composition should be included, if at all possible. As a final step, the heater log sheet should be reviewed to see if there have been major swings in operating levels between inspections.

The instrumentation should be checked for operability, with particular emphasis on thermocouples. Any sign of a malfunctioning couple should be reported and repairs made promptly. Once every 6 months it is desirable to check the accuracy of each heater thermocouple.

Report . . . The entire inspection should be summarized in a short report. The task of recording the essential information can be simplified by the use of standardized forms or diagrams. Shown is convenient "check



OVERHEATED TUBE shows heavy scaling and blistering, resulting in tube failure.

lists" type of form which has been in successful use for some time.

The data on each inspection report should be compared with the original design conditions of the heater in question. The reasons for any important differences must be immediately determined and remedial measures taken if faulty or dangerous heater operation is indicated.

Some examples of specific conditions which should serve as warning signs are as follows:

1. Fuel-gas pressure well above design, indicating either excessive heat release or firing with insufficient combustion air.

2. Excessive temperatures at the top of the radiant firebox, indicating overfiring or too much excess air.

3. Positive pressure at the top of the radiant firebox, indicating excessive firing rates.

4. Undue variations in outlet temperatures on multipass heaters, indicating unequal flow distribution or flame impingement. Differences greater than 5% of the design temperature pickup should be investigated carefully.

5. Pressure drop greater than design, indicating coke buildup, high charging rates, or vaporization greater than design with consequent increase in furnace loading.

6. Pressure drop well below design, indicating low flow rates which might result in stagnation of flow on multipass heaters.

Graphical record . . . Compilation of the significant inspection data into a graphical operating record will prove most helpful in presenting a clear visual summary of the operating history of a unit. The chart illustrates a simple method for presentation of heater duty, firebox temperature, and flue-gas temperature.

Any additional desired data can be plotted the same way. However, care should be taken that the charts are not crowed to the point of losing their clearity.

The deterioration of heater components is directly related to the operating level. A continuous record will aid materially in anticipating trouble spots and pin-pointing dangerous situations. As a general rule adequate heater data are logged in most plants. However, too frequently they are filed away and never organized into the type of simple operations summary so helpful in building up an experience record.

Prior to shutting down the heater the inspection data obtained during the operating period should be analyzed and potential trouble spots noted. Plans for a detailed inspection should emphasize those heater components most likely to have suffered damage during operation. Probable repairs also can be evaluated and the necessary materials provided.

Inspection . . . The components requiring the most time to repair or replace should be inspected first. A recommended sequence is to start with the tube coil, continue with the tube-support system and other internals, the refractories, the breeching, the stack, and the burners, in that order.

The frequency of periodic shutdowns for mechanical inspection will primarily be set by the maintenance requirements of the tube coil. From the standpoint of safety it is very important that a corrosion rate for the tube coil be determined and that a tube-retirement thickness be established, based on this rate.

Before placing a new heater in operation, a thickness test of all the tubes should be conducted. The exact points at which the tests are made must be located accurately on a diagrammic layout of the tube coil.

The first shutdown should come at the end of approximately 6 months of operation. At that time the identical spots checked in the previous inspection are again located and the thickness tested. A comparison is then made between the new data and the original wall thicknesses.

If the corrosion rate determined by this comparison is negligible, the next shutdown for inspection may be scheduled for approximately 1 year later. Thereafter, inspections and thickness tests should be conducted as regularly as possible on a yearly basis.

From this accumulated data, the estimated life of the tubes can be determined and replacements arranged for a specific shutdown.

Shutting Down the Heater

The first step in preparation for shutdown is to place the heater on manual control and retard the firing rate to lower the charge outlet temperature to 50° F. below the normal operating temperature. When the temperature has stabilized at this point, the gas to the burners and pilots is shut off.

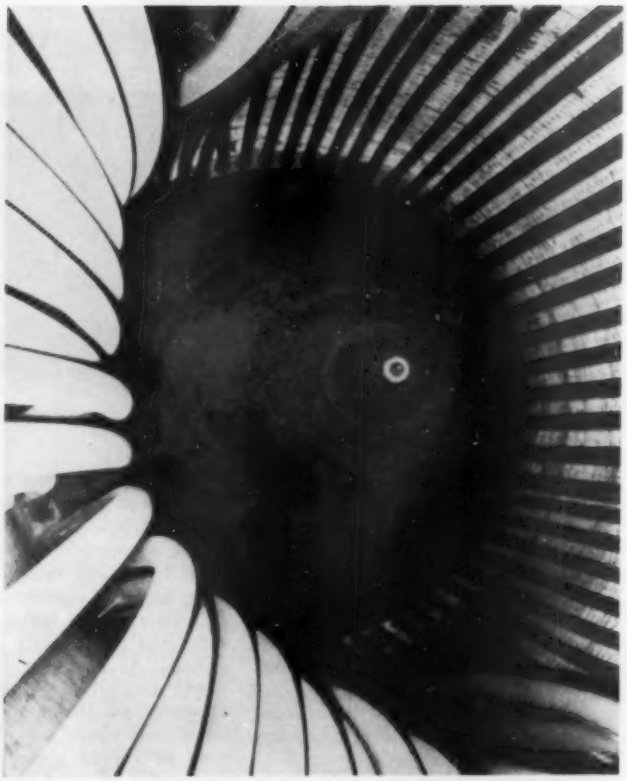
The circulation of the fluid charge should be continued until the outlet temperature has dropped an additional 50° F. so that it is approximately 100° F. below operating temperature. When this point is reached, shut off the circulating pumps and close the inlet valve to the heater. Open the drain valve immediately and then close the outlet valve from the heater.

Blowing . . . As soon as the pressure in the tubes has dropped below the available steam pressure, open the steam valve and blow the heater. The blowing time required to clean the tubes thoroughly is a function of the mass flow of steam available. A telltale connection on the drain line when used to check the appearance of the steam leaving the heater is of great assistance in determining the length of blowing time required.

Depending on the type of heater design, a blowing time of 4 to 8 hours is adequate. The initial blow should be heavy enough to clean the tubes. Subsequently, a milder steaming is required, primarily to remove the residual heat of the setting and prevent overheating of the tubes. With lightweight insulating firebrick, this residual heat is so low that no steaming is required once the tubes are clean.

Modifications . . . At gasoline plants where the steam supply is severely limited, satisfactory results can still be obtained by modifying the blowdown procedure. First, drop the out-

EXCESSIVE SCALING on heater tube results in local external metal loss.



LOSS OF FLOW causes overheating and results in heavily scaled and badly bowed tubes. Note bowed tubes in right foreground and center background.

let temperature 50° F. on manual control, as described previously. With the burner still on, shut off the circulating pumps, open the drain, close the inlet and outlet valves, and introduce the steam. This series of operations must be done rapidly.

Hold the outlet temperature of the steam at 500° F. on manual operation and continue to steam for at least 2 hours. Then lower the temperature at the rate of 100° F. per hour to 300° F., at which point the burners can be shut off. Complete the operation by continuing to steam out for one additional hour. It must be understood that in this latter procedure, close and accurate supervision is necessary.

Before any personnel are permitted to enter the heater, the fuel gas and steam snuffing lines should be disconnected to avoid any possibility of accidental discharge of gas or steam into the firebox.

The Tube Coil

It is generally accepted that the most critical component of a heater is its tube coil. A question very frequently raised, therefore, is how long a set of tubes may be expected to last in normal service. Based on reasonably careful operation at design conditions, and with no unusual corrosive attack, carbon-steel tubes have remained in use for 10 years or longer.

However, over an extended period of time, heater operation hardly ever remains normal. Inevitable plant upsets occur which place the heater components under unusual stresses. In some instances, operation well above design may become necessary for an extended period of time. Therefore, tube life is determined in large part by the nature and duration of unusual process conditions rather than by the normal day-to-day operation at design levels.

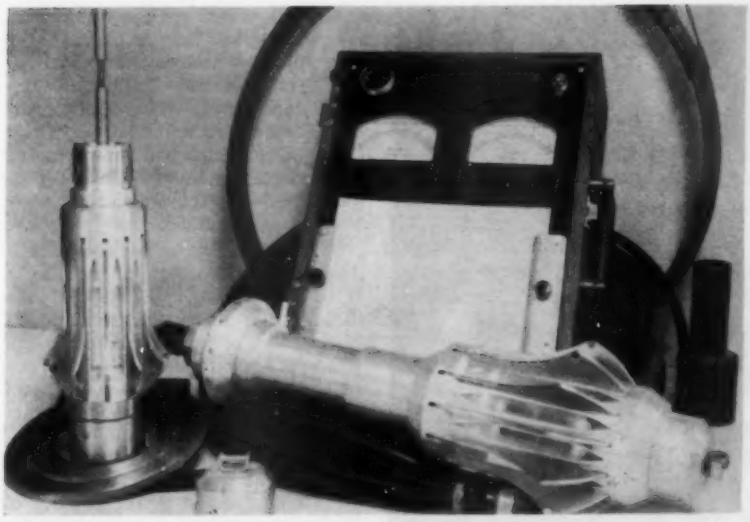
Tube-damage factors . . . Tubes are most likely to suffer damage at the two extremes of the operating range. Heater loading above design may result in excessive local heat-transfer rates, high film temperatures, and coke laydown. Overloading is most critical when based on increased temperature pickup rather than high charging rates.

However, the most hazardous situations frequently occur at the low operating levels. At greatly reduced flow rates, heaters designed with two or more parallel streams are subject to unequal flow distribution, channeling through one pass, or surging between passes. These unstable conditions are closely associated with high film temperatures and coke deposition.

Poor heat distribution in the radiant firebox will greatly increase the possibility of damage to the tube coil at either operating extreme. If a review of the operating log indicates that heater duty or charge rates have ranged either below 50% of design or above 110% of design, the tube coil should receive close attention during the mechanical inspection.

Tube inspection . . . Inspection of the tube coil should logically start with a check of the external tube surface for any signs of undue oxidation or scaling. Under normal conditions only a very fine powdery oxide is present. Local hot spots usually appear as areas where no visible oxide film is present and where the tube surface has assumed a slightly darker gun-metal hue.

In some cases of overheating and coking within the tubes, these hot spots may show a slightly crazed surface, similar in appearance to old paint. This is an indication of scale



CALIPERING EQUIPMENT such as this electrically operated unit can measure badly pitted tubes effectively.

cracking associated with metallic creep.

A typical example is illustrated. Thermal cycling in connection with surging between passes at low flow rates may cause repetitive scale cracking and accelerated local oxidation. The cracks will gradually deepen, forming points of stress concentration which may lead to ultimate failure.

The more extreme examples of overheating caused by excessive transfer rates or flame impingement, will exhibit heavy scaling and blistering.

Serious scaling . . . In all cases of serious scaling the tubes must be checked for local thin spots and the extent of metal creep. The effects of excessive scaling on a carbon-steel heater tube are illustrated. The very considerable reduction in wall thickness on the flame side of the tube should be noted.

The use of inside calipers would fail to detect this condition since the metal loss has taken place primarily on the external tube surface. It is imperative, therefore, that all areas indicating serious oxidation be inspected for wall thickness, using the nondestructive testing equipment available for that purpose.

The degree of metal creep may be expressed as a percentage and calculated as follows:

$$\text{Per cent creep} = \left(\frac{\text{existing o.d.} - \text{design o.d.}}{\text{design o.d.}} \right) 100$$

The existing outside diameter is obtained by measuring the tube circumference and converting it to outside diameter. Tapes are commercially available which will read directly in outside diameter for ease in measuring.

This method is accurate only if the metal creep has been reasonably uniform around the entire tube circumference. In cases where the overheating or scaling has affected a limited area, such as the front tube face, an approximate correction factor to obtain local creep must be applied:

$$\frac{360}{\phi} \text{ (calculated creep)} = \text{local creep}$$

where ϕ = affected area expressed in degrees of arc.

It is suggested that tube replacement be based on a maximum allowable local creep rate of 3%.

Wobble gages . . . These may be used as an alternative to measuring tube circumference with a tape. These gages consist of semicircles cut out of sheet metal or thin plate. Using the foregoing tube-retirement criterion, the diameter of the semicircle would be 1.03 times the original tube o.d., allowing for the metal creep.

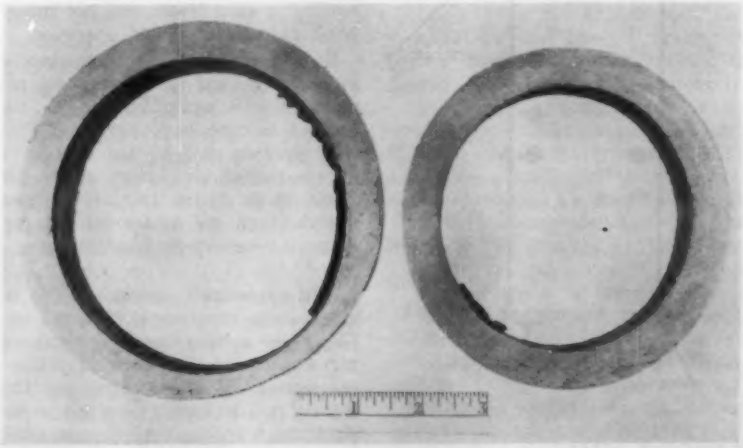
In using the gage, if any substantial part of the tube circumference fits snugly into the arc of the gage replacement of the tube is indicated. Gage sizes for some of the standard tube sizes are as follows:

Tube size, o.d., in.	Gage diam., in.
3.50	3.60
4.00	4.12
4.50	4.64
5.563	5.73
6.625	6.82

In addition to metal creep, replacement of tubes is a function of the minimum allowable retirement thickness. Calculation of retirement thickness is usually based on the assumption that the remaining tube metal is structurally sound and that normal design stress values for the material in question may be used.

Therefore, the use of retirement thickness as a criterion for tube replacement must be based on a gradual reduction of tube-wall thickness resulting from internal corrosion or external oxidation at normal temperatures.

Values for minimum retirement thickness most definitely should not be applied to bulged areas in overheated tubes where creep has been local in nature. These areas have frequently undergone substantial changes in metal structure with attendant



INTERNAL METAL LOSS results from non-uniform heating, left. No metal loss is apparent when heating has been uniform (right).

ULTRASONIC TESTING EQUIPMENT gives visible thickness indication.

major reductions in strength or ductility. The use of minimum retirement thickness in such cases, rather than maximum allowable creep, may result in dangerous and destructive tube failures.

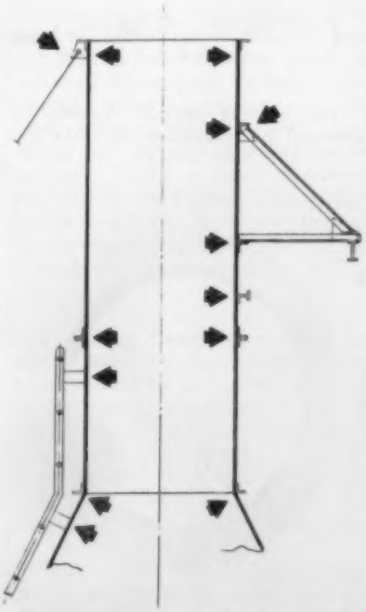
Hammer tests . . . These are occasionally used in an attempt to discover changes in the metal structure. However, such qualitative tests are not accurate and are readily influenced by internal coke laydown or the size of the affected area in relation to the rest of the tube. Positive conclusions from the use of hammer tests are usually restricted to tubes already close to the point of failure.

As a general rule, the application of the scaling hammer is best limited to cracking and removing all surface scale prior to making the necessary accurate quantitative measurements just outlined.

Replacement of tube sections is very often possible without removing the entire tube from the heater. As a rule of thumb, tubes of 4.50-in. o.d. on 8-in. centers and larger tube sizes on equivalent longer centers may be welded in place. The 4.00-in-o.d. size is marginal, depending on the skill of the operator. Mirror welding is often used to weld the back of the tube.

In many instances, however, the tube can be jacked away from the furnace wall sufficiently to perform the welding in normal fashion. In the smaller tube sizes it is usually more economical to remove the tubes from the heater and make the necessary repairs outside the firebox.

Surface-metal variation . . . During inspection of the tube coil a careful search should be made for any variation in surface metal appearance between parallel passes. Well-defined differences are a clear indication of nonuniform flow of the fluid charge. A very substantial percentage of tube failures is caused by overheating resulting from low flow or loss of flow.



CORROSIVE ATTACK on heater stacks may be expected in the areas shown by the arrows.

In multipass heaters, extreme reduction in flow usually results in complete stagnation in all passes except one. The one remaining pass in which flow has continued will show little or no damage whereas the remainder of the tubes will frequently be heavily scaled and sometimes badly bowed.

A good example of this condition is illustrated. The heater in question, a vertical two-pass unit, suffered the damage shown as the result of a gradual loss of flow extending over a period of approximately ½ hour. Flow failure was occasioned by plugging of the pump intake screens shortly after the unit was put on stream.

The serious bowing and scaling of the one tube pass in the foreground is in striking contrast to the absence of any appreciable damage to the other pass in the background.

In cases where improper flow distribution has been quite temporary in nature, the damage to the tube metal may scarcely be noticed. However, the inspector should check carefully for any signs of this condition because his report may be the first indication of incipient trouble.

Tube distortion . . . This is generally caused by either thermal stresses or loads transmitted from the external heater manifolding. Corrective measures require that the loading be removed by a proper support system or the tube bending will become progressively worse with the possibility of ultimate failure.

In cases where bowing is the result of temporary overheating with no attendant serious damage to the tube metal, little is to be gained by an attempt to straighten the tubes. Straightening heater tubes in place, using a special jack and holding jig, is a slow, expensive procedure; and unless the bowing is very severe will not measureably improve heater operation.

With carbon steel it is frequently more economical to cut out and replace the worst sections rather than try to bend the tubes back into place. This will generally not be the case with intermediate-chrome alloy tubes because of the higher cost of the tube material and the additional expense of stress relieving the weldments.

Low-temperature corrosion . . . In areas where sour gas is fired the external tube surface should be inspected for low-temperature corrosion. Concentrations above 500 grains per 100 std. cu. ft. are suspect from this standpoint. Both H_2S and mercaptans must be considered potentially troublesome. Mercaptans are likely to dissociate

in the flame burst, forming free sulfur which oxidizes to SO_2 and SO_3.

The dew point of the products of combustion may range as high as 400° F. With the high concentration of water vapor in the flue gases, H_2SO_3 and H_2SO_4 will be formed at any temperature below the dew point.

Heaters with coil inlet temperatures below 350° F. are, therefore, potentially subject to corrosion of the external tube surface. The sections of inlet tubes extending through header boxes should be checked carefully. Return bends on the bottom tube banks of convection sections are vulnerable on horizontal heaters operating at low draft levels.

Any slight pressure condition in the furnace will force the products of combustion out through the header boxes and over the relatively cool tube surfaces where condensation is likely to occur.

Tube Cleaning and Measurement

The removal of coke and measurement of tubewall thickness present no great problem on tube coils equipped with plug-type return bends. Coke laydown in gasoline-plant service is usually not severe although deposits of ⅛ to ¼-in. thickness, have been noted after several years of operation.

Mechanical cleaning of tubes requires approximately 175 to 200 c.f.m. of air supplied to the turbine head of the cleaner at 100 psig. Reports of improper functioning of tube-cleaning equipment are very often traceable to excessive pressure drop between the air compressor and the location of the work.

Line sizes must be large enough to supply the necessary volume and pressure of air at the turbine.

Tube calipering . . . Tube inside diameters may be calipered mechanically or electrically. Simple mechanical calipers can be used which measure the inside diameter of the tube and, by means of a mechanical linkage, provide a reading on an external scale. Their accuracy is limited, however, and they become more difficult to handle as tube lengths increase.

Several electrical tube calipers are now available which have been developed primarily for the inspection of oil-refinery heater tubes. One type consists of a meter unit and caliper head connected by a variable length of electrical cord. The caliper head is equipped with spring-actuated, pivoted fingers in a housing.

The fingers make continuous contact with the walls of the tube and at the same time position an armature between two coils, thereby fixing the relative impedance of the coils and causing the inside diameter of the tube to be indicated on a properly calibrated meter.

Illustrated is a 12-finger dual-meter caliper which utilizes the three most depressed fingers to center the head in the tube and read the diameter established by these fingers on one meter.

The other meter indicates the diameter corresponding to the position of the finger which extends farthest beyond the first diameter. This type of caliper is very effective in measuring badly pitted tubes.

Caliper data . . . Information provided by the use of tube calipers must be evaluated very carefully. It is impossible to determine from the data obtained whether or not corrosion in a tube has occurred symmetrically around the inside circumference.

To be conservative it must be assumed that the reduction in wall thickness resulting from an increased inside diameter has taken place on one side of the tube only. This assumption is frequently correct since corrosion is a function of temperature and is usually greatly accelerated on the fire side of the tubes in areas of high transfer rates or local flame impingement.

All-welded coils . . . Over the past several years the installation of completely welded tube coils has become more prevalent in gasoline plants. This is based on the assumption that this service is "clean" duty and that coke laydown will not be a problem. Insufficient data are at hand to determine whether this assumption is entirely correct. If it is not completely valid there will be occasional serious problems on how to clean tubes in all-welded coils.

If an adequate plant steam supply is available, the most practical solution is steam-air decoking. The necessary air can be supplied by one or two mobile 350-c.f.m. compressors, depending on the size of heater. A special manifold must be installed to control the steam and air properly.

Several skin thermocouples located on the heater tubes are very desirable although not absolutely essential. The entire operation, including all preparations, when done for the first time on a medium-sized heater would require approximately 4 to 5 days. Thereafter, the time can be materially reduced.

If plant steam is not available, a portable steam generator can be used. A detailed discussion of steam-air decoking is beyond the scope of this article. However, considerable information is available on the subject and the operation is performed regularly in most refineries in the United States.

The only alternative to steam-air decoking is the removal of the welded return bends from one end of the coil. However, before doing any cutting, it would be well to check carefully and see if there is sufficient clearance for rewelding the return bends to the tubes. What may be adequate tube spacing to permit an occasional repair in the radiant firebox, may be totally inadequate in the confines of a narrow header box. If the required access is not available, it may be necessary to partially remove the tubes from the heater in order to do the work.

In the case of vertical-tube heaters, the top return bends should be removed and small circular cleanouts provided in the bottom return bends. After cleaning is completed, the openings at the bottom are sealed with a circular plug and welded with a heavy fillet.

Another problem of all-welded coils is the determination of tube-wall thickness. Since inside calipering is out of the question, all wall-thickness measurements must be made from the outside. This can be done in two ways. One, a mechanical method, consists of drilling tell-tale holes into the tube to the proper retirement thickness.

When the tube wall has been reduced to the minimum retirement thickness, a minute leak will develop. This manifests itself as a small flame emanating from the tube. Whenever this condition is observed the tube must be removed and replaced.

To be effective, all the tubes in a coil must be drilled in this manner at regular intervals (approximately 2 ft. apart on the longitudinal axis of the tube). The method is simple and positive in its results. However, it is impossible to anticipate the time when retirement of a tube will become necessary and this must be considered a major disadvantage.

Ultrasonic testing . . . A much more satisfactory method of measuring wall thickness of tubes is the use of ultrasonic testing. This type of equipment utilizes a piezo-electric transducer excited by a sweep oscillator. The high-frequency vibrations are transmitted through the tube wall and reflected from the rear face.

Each wall thickness has its own fundamental resonant frequency and when the transmitted frequency equals the resonant frequency or one of its harmonics, there is a considerable buildup in amplitude of vibrations. The resonant frequencies are translated into linear thickness, using an audible or visible signal and properly calibrated scales.

A portable instrument, using a cathoderay tube for presenting a visible signal, is illustrated.

Tube-well thicknesses may be measured with a high degree of accuracy. Coke deposits in the tubes will not interfere with the readings if the instrument sensitivity is increased by operating in the 4-mc frequency range.

Miscellaneous Heater Internals

The major heater internals which require periodic inspection are tube sheets, tube-support castings, guide castings, and reradiating cones or baffles.

On vertical heaters the bottom supports, or tube sheets, are covered by the insulating concrete floor. They seldom, if ever, require repair or replacement as the result of normal operation.

Tube sheets on the end walls of horizontal heaters are frequently protected by a covering of refractory tile or a castable material. Cracking and spalling of the covering can expose the tube sheets to direct radiant heating.

In the case of low-alloy castings, this will result in their rapid deterioration and possible failure. These areas should be checked carefully during the furnace inspection.

Tube-support or guide castings of high nickel alloy are subject to embrittlement in the 1,400° to 1,600° F. temperature range. However, this is also the normal operating range of such castings. Therefore, after once being in service, they become exceedingly brittle and are quite subject to failure from fatigue or impact loading.

It is well to remember this whenever tube replacements or repairs on the coil must be made. Rough handling has cracked and broken many castings that would otherwise have given many more years of service.

Welding repairs on high nickel-alloy castings after exposure to temperature are very difficult. The lack of ductility is usually so great that the stresses set up by the temperature differences between the heat-affected zone of the weld and the base metal result in cracking of the material.

In some instances repairs can be made if the entire area in the vicinity of the weld is brought up to a temperature of approximately 1,400° F. and held there during the entire time that the piece is in work.

As an alternative, the material can be annealed by heating to approximately 2,000° to 2,200° F., holding it for half an hour at temperature and then quenching suddenly.

In the case of larger components which must be annealed inside the firebox, quenching is a problem. However, excellent results can be achieved by using low-pressure steam as a cooling medium.

Check for binding . . . Guide, support, and tube-sheet castings are designed to permit tube expansion. The direction of expansion and mechanical method by which the guides absorb the tube movement are generally shown on the manufacturer's prints.

Good inspection procedure requires that all guides and supports be checked to make certain that there is no binding between guide or support castings and the tubes.

The support linkage of reradiating cones should be inspected regularly to make sure that the tension is approximately the same in all the hanger rods. The cone surface is made of high chrome-nickel plate or cast material, or a combination of the two. It normally operates in the 1,500° to 1,600° F. temperature range. The cast materials will stand substantially higher temperatures and more corrosive attack than the wrought plate.

At firing rates well above design or in the event of severe burner malfunctioning, design temperatures are exceeded and deterioration of the cone materials may take place. If inspection of the cone indicates excessive oxidation or corrosion, the substitution of cast for plate materials in the affected areas should be considered.

Refractories

Two distinct types of refractory linings are used in gasoline-plant heaters today. One design consists of a lightweight insulating firebrick wall. The other is composed of a monolithic cast refractory.

Castable refractory walls should be inspected carefully, especially during the initial operation of a new furnace. Practically all castable materials shrink to some extent upon heating to their service limits.

The lighter insulating refractories tend to shrink more than the denser castables. Shrinkage cracks may, therefore, occur as the material moves into the higher temperature ranges (in the order of 1,400 F. and above).

It is important to bring the lighter, more porous castable settings up to temperature slowly. If brought up too fast the retained moisture will build up destructive steam pressures and cause major cracking of the wall. Repeated temperature cycling will also promote cracking and spalling.

Lining inspection . . . A detailed inspection of the heater lining should be performed at the first scheduled shutdown. Any cracks which are more than a hair-line separation should be cleaned out the full thickness of the material so that the walls of the crack are parallel. They can then be calked with a gun or a pointing trowel.

Cracks should never be cleaned out in a V-shape, with the opening at the front wider than in the back. In the case of surface spalling where there is appreciable loss of material, the affected area should be completely cleaned out back to the heater casing. The edges are then trimmed so the joint between the old and new material is at right angles to the exposed face of the refractory.

Repairing castables . . . It is important to remember that layers of castable material will not bond to each other. Whenever it becomes necessary to place one layer upon another, a reinforcing material tied back to the furnace casing must be used in the second layer.

In using castable material for repairs, the required amount of water must be carefully measured and conform exactly to the manufacturer's recommendations. As soon as the material has achieved its initial set it should be cured for approximately 24 hours by keeping the surface moist.

This can be done with a soft whitewash brush or a conventional paint sprayer. The time required for initial set will be a funtcion of the ambient temperature and the humidity. It may vary from a half hour up to several hours. When a finger can be drawn lightly over the refractory surface without picking up any moist material, it is time to start the curing process.

Failure to cure the material and retard set may result in shrinkage cracks and surface crazing which can become troublesome.

Maintenance on insulating firebrick walls is usually negligible. The very low linear expansion or contraction with changes in temperature results in a very stable structure, not generally subject to mechanical deterioration. On occasion, however, such wall construction may be damaged as the result of overheating when a heater is fired without process flow through the tubes.

Since little or no heat is removed from the firebox, the face temperature of the setting increases until the fusion point of the brick is reached. At this point the brick surface becomes plastic and begins to flow. As soon as the setting cools off, the brick face solidifies again, forming a hard, glazed surface.

The thickness of the glaze is an indication of the length of time that the brick face remained at the elevated temperature. As a general rule this glaze represents the full extent of the damage. No repairs are required or recommended since the performance of the setting is usually not seriously affected.

Mechanical damage . . . In the event

of a tube failure, impingement of the released fluid on the setting may result in mechanical damage. In such cases all damaged brick should be removed and the surrounding brick supported temporarily by wooden cribbing. The replacement brick can then be installed in conventional fashion and the wooden blocking gradually removed.

If the heater tubes are 4-in. o.d., or larger, the brick can be installed without removing the tubes, thus simplifying repairs. The use of wash coats of high temperature mortar over the brick face is not recommended. The mortar shrinks considerably at elevated temperatures and consequently tends to spall off pieces of brick, resulting in an unsightly appearance.

Stacks

Heater stacks are built to last indefinitely under normal service conditions. However, when burning sour gas, rapid deterioration of a stack may take place. Serious corrosive attack in the cooler portions of the stack is particularly prevalent during periods of low temperature and high winds.

Obviously the top of the stack is most likely to be affected. However, any external flange or lug acts as extended surface and tends to cool the surrounding stack metal. In addition the flange connections, stiffeners, and lugs are usually welded to the stack plate with resultant localized stress concentration at the point of welding. This combination of stress and lowered temperature accelerates corrosion in all areas of the stack plate where there are external projections.

A composite sketch of typical stack details is shown with the important areas subject to corrosive attack indicated by arrows.

Corrosion near stack . . . The normal low-pressure area existing on the lee side of stacks draws flue gases downward for a considerable distance before they can drift away with the wind. Consequently there may be serious corrosion on all external connections near the top of the stack. In regions where strong prevailing winds are commonplace, the lee side of stacks should be given special attention.

The extent of stack corrosion is most readily determined by using nondestructive thickness testing equipment. An alternate method is to drill a ⅛-in.-diameter hole through the stack plate in the suspected area. A gage is made consisting of a ⅛-in. drill stem into which a small notch has been cut, equal in width to the original design plate thickness.

The notched end is inserted into the hole and hooked over the stack plate. The amount of play existing between the plate and the edges of the notch is an approximate measure of the reduction in plate thickness. The holes should be tightly plugged before resuming heater operation.

Stack corrosion can be controlled by the installation of a protective liner. Materials to be considered are high-temperature metallic paint, castable refractory, or glass-lined stack sections, depending on the corrosion resistance and degree of permanence required.

An alternate approach consists of insulating the stack externally in order to raise the metal temperature above the dew point. The former approach is to be recommended since external insulation can result in serious overheating of the stack metal in the event of a sudden and unexpected increase in flue gas temperature.

Afterburning in stacks has resulted in serious damage and some instances of complete stack failure. Firing with insufficient combustion air permits substantial quantities of carbon monoxide to enter the stack. At low flue-gas temperatures there are no serious consequences.

If, on the other hand, stack-gas temperatures approach 1,000 °F., the carbon monoxide will ignite wherever there is any air infiltration. In stacks where cooling air is admitted the burning will take place at the intake ports. Where no cooling air is admitted the burning usually takes place near the top of the stack.

Any undue blistering of stack paint, particularly in localized areas should be cause for suspicion. Reports of exceptionally high stack temperatures should always be checked for the possibility of improper combustion conditions leading to afterburning.

Unlined, self-supporting stacks are particularly vulnerable to failure from this cause since the ignition of CO occurs at a temperature level where the strength of carbon steel falls off very rapidly with any increase in temperature.

Simple overfiring of a heater results in an attendant increase in stack temperature. In the case of overfiring accompanied by high excess air, oxidation of all metallic surfaces will show a marked increase. If inspection of the stack interior indicates any signs of excessive oxidation or scaling, the stack plate should be checked for thickness.

Burners

Burners in gasoline plant heaters are normally a very low maintenance item. However, when burning untreated gas containing hydrogen sulfide, deterioration of certain burner components may become a problem.

In the case of inspirating or "premix" burners, the presence of appreciable quantities of hydrogen sulfide in the flue gas will corrode the firing heads, or spiders, quite rapidly. The port drilling becomes irregularly enlarged resulting in erratic flame patterns. The burner ports should be spot-checked for soundess and correct size as a matter of routine inspection.

A drill size conforming to the manufacturer's specifications for port drilling is a simple and effective gage. Under no circumstances should corrective drilling to restore roundness be attempted without a specific recommendation from the manufacturer.

Even a small increase in the port drilling frequently leads to radical changes in flame pattern. In cases of serious corrosion the cast steel burner spiders should be replaced with high chrome alloy material.

Orifice check . . . The gas-limiting orifice at the entrance of the inspirator or venturi should be checked for size and roundness at every shutdown. Even though it is in a cold zone, the high turbulence at the edges of the vena contracta of the gas jet may erode the mouth of the orifice.

Whenever corrosive gases are fired this condition can become quite pronounced. In such cases a stainless-steel replacement of the orifice is indicated.

The tips of noninspirating or raw gas burners are generally made of alloy material and will operate quite satisfactorily in the presence of hydrogen sulfide. However, these nozzles are located in a hot zone and at high operating temperatures there is the possibility of a sulfide scale buildup. Therefore, the burner opening should be checked for this condition. Since these tips operate at a much higher pressure than the heads or spiders of premix burners, any change in the port opening has a much more pronounced effect on the performance of the burner.

During each shutdown the burners should be checked against the burner and heater manufacturer's blueprints for alignment and proper position in the muffle blocks. Burner positioning is critical and deviation of small fractions of an inch can cause major differences in flame pattern. Inspection also should make certain that all burner air registers move freely.

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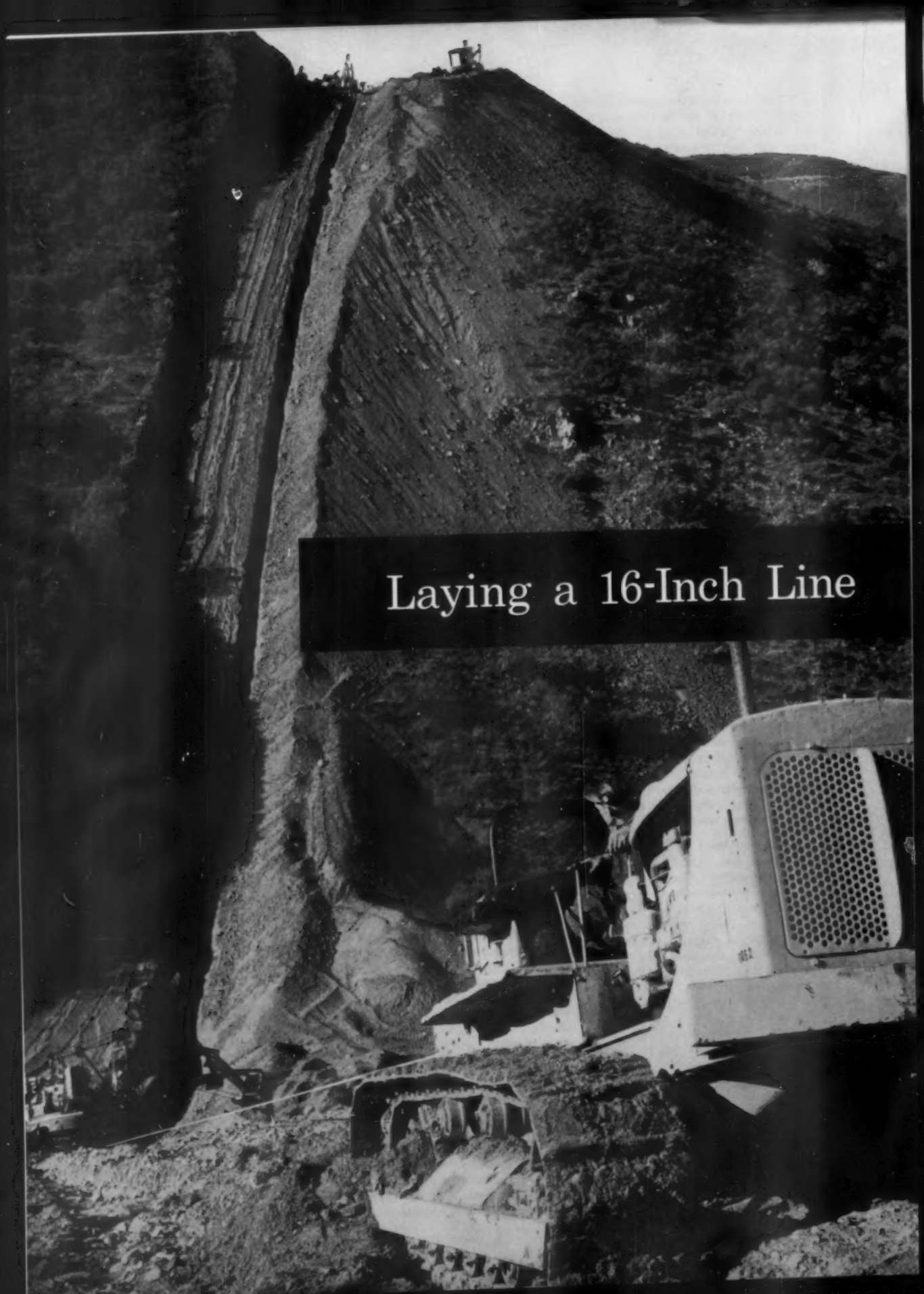

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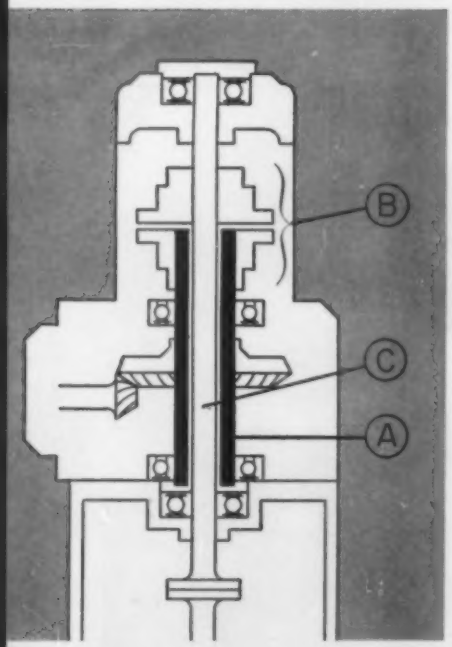

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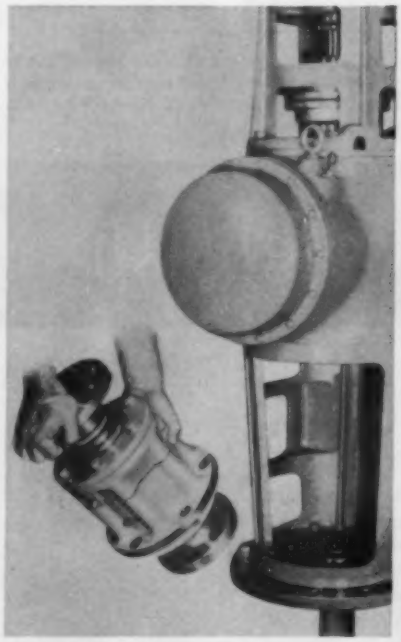

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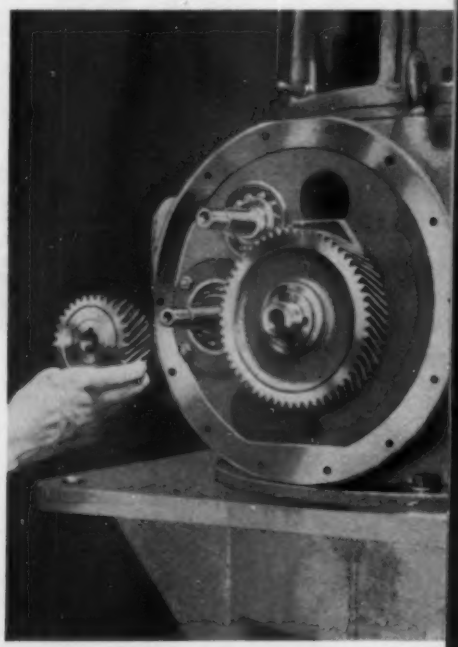

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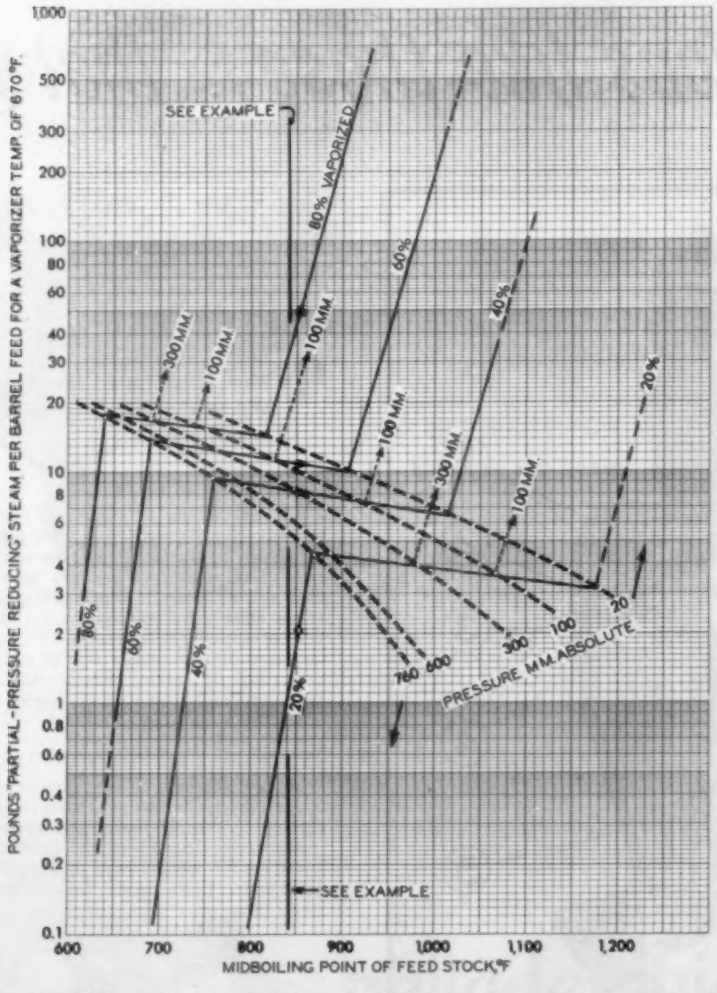
Process steam and its cost—vacuum distillation

THE COST of jet and process steam is by far the largest single cost in the operation of most petroleum vacuum plants.

Although a dry vacuum system, that is, one that does not employ steam as a partial-pressure reducer can be used, it has been found economical in almost all petroleum plants to use partial-pressure steam. The effect of steam when the pressure is held constant has been indicated (for atmospheric pressure) in Process Costimating No. 31, "Process Steam for Atmospheric Distillation," The Oil and Gas Journal, Nov. 10, 1958, p. 148, and also in No. 32, Nov. 17, 1958, p. 187, which applies to narrow-boiling-range materials that may be steam distilled. When handling very high-boiling materials, the pressure is reduced and the amount of steam required at various pressures (vacuums) is somewhat as indicated in the accompanying figure.

In the figure it is assumed that half of the reduction in temperature is produced by vacuum and half by the partial pressure reduction of steam. Thus the lines in the lower left corner for atmospheric pressure would have proceeded onward to high steam consumptions had not the pressure been reduced at the breaks in the lines. Thus the center portion of the lines indicates changes in the pressure from atmospheric pressure down to pressures as low as 20 mm. Finally, in the upper right region of the figure, all of the lines are for a pressure of 20 mm., but whole families of lines of different pressures are useful in the upper part of the diagram. Such lines are not shown but are indicated by a few dashed lines pointing upward in the center of the chart.



INDICATION of the amount of "partial-pressure-reducing" steam required per barrel of mixed-base residue when maintaining a vaporizer temperature of 670° F.

Words cannot adequately explain the chart or its use, but study of the following tabulation for an 840° F. midboiling-point material may permit understanding:

Percentage vaporized	Pressure mm.	Lb. steam per bbl.
20	760	1.15
25*	760	5.1
29*	600	5.8
40	300	8.0
55*	100	10.0
60	90*	10.5
74*	20	12.3
60	100	18.0
80	20	35.0

*Estimated by interpolation.

Somewhat different spreads between the lines are obtained for materials of different distillation slopes from the normal ones for straight-run residues shown here. Furthermore, somewhat different amounts of steam are required if materials of different molecular weight are distilled (materials of 11.7 characterization factors considered here).

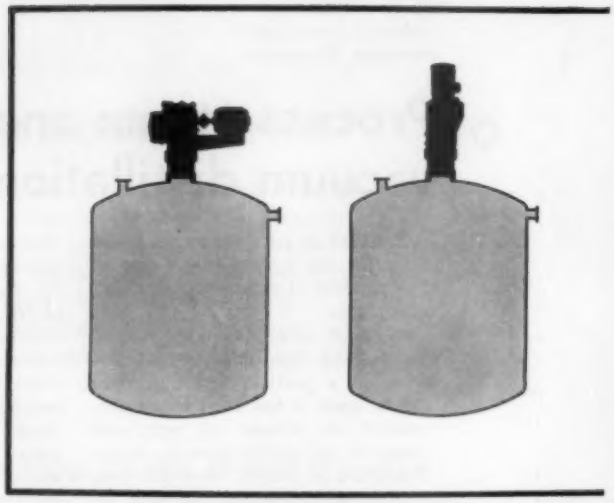
Steam is also required by jet ejectors to produce the vacuum, and the amount needed will be presented in Process Costimating No. 34 next week. The optimum or least amount of total steam required for both partial pressure reduction and actuation of the jet ejectors has been discussed on pages 252-256 of the fourth edition of Petroleum Refinery Engineering (McGraw-Hill Book Co., Inc., New York, 1958). W. A. Peters presents an excellent and probably the only comprehensive discussion of vacuum distillation, and steam and water requirements, on pages 1603-1606 of Vol. II of Science of Petroleum (Oxford Univ. Press, New York, 1938).

Q. **If headroom is no problem, do vertical motor mixer drives have any advantages over horizontal motor units?**

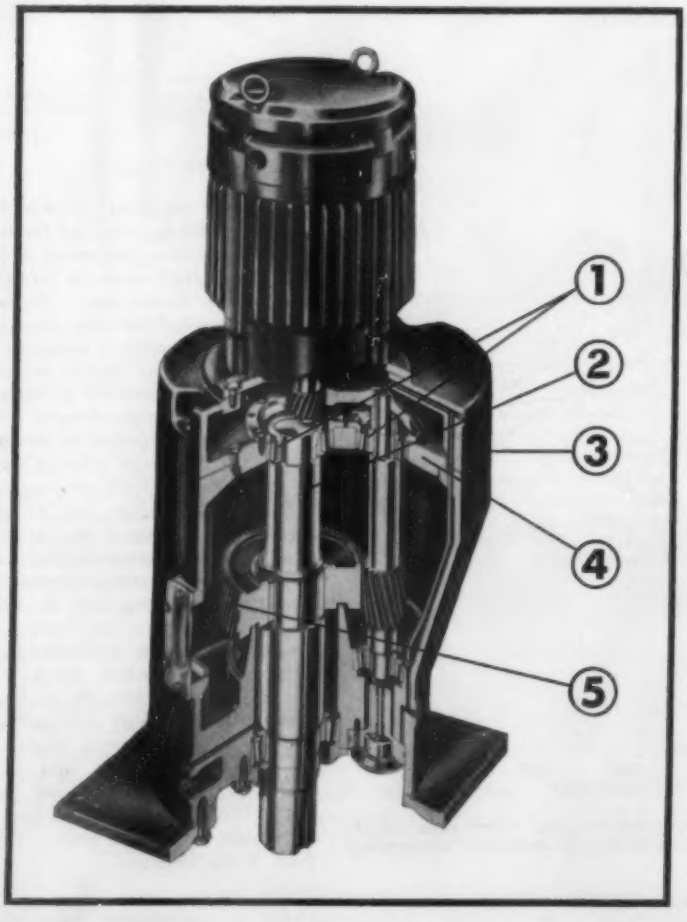
A. Philadelphia horizontal motor "3800 Series" and vertical motor "MV Series" both have the same high quality construction. From the standpoint of performance, drive efficiency and life expectancy, they are equal. However, each type has certain inherent advantages.

"3800 Series" units have an advantage in operating and mounting flexibility to meet changing process requirements. Change-gear sets are easier to install. Motors are somewhat easier to replace and horizontal drives can more readily utilize special motors such as variable speed types. Headroom requirements for the "3800 Series" are minimum for maximum bearing span. On the other hand, horizontal motor drives occupy more room immediately above the tank top and stresses imposed upon mounting nozzles by the overhung motors can require extra drive support . . . especially in the larger sizes.

"MV Series" vertical motor units have an advantage in that they occupy much less space at tank top, making it easier to install process piping. Better access to the tank is provided. Supporting difficulties are minimized because vertical drives are better balanced. While vertical motor drives are less flexible for a quick change of motors and output shaft speed, their greater inherent design simplicity makes them a more economical offering. They will usually be a sound choice when adequate headroom is available.



it's questions like these... that get

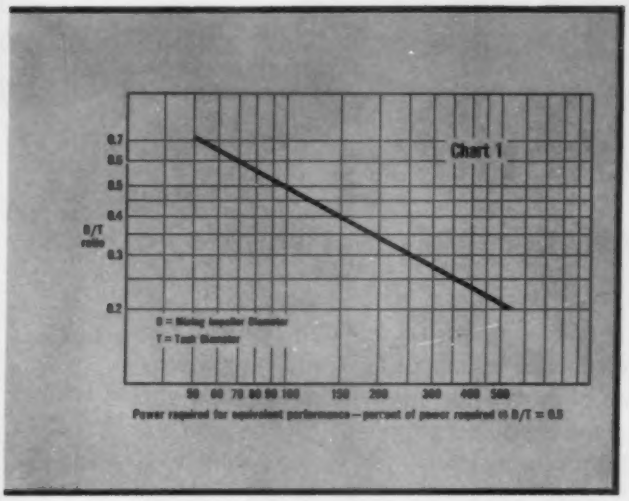


Q. **What design factors insure maintenance of drive shaft alignment, even after years of operation?**

A. The ability of a shaft to run dead-true, through years of operation, depends primarily upon the design approach of the manufacturer. When extra large, extra high capacity bearings (1) are used, shafts (2) can be larger, stiffer, heavier duty. When other drive components . . . housings (3) bearing supports (4) and gearing (5) . . . are designed for extra strength, shafts will be supported with near-absolute rigidity. Result: damaging shaft deflection simply cannot occur. Gearing is effectively isolated from unbalanced loads.

You will get truer shaft operation at shaft seals.

Whenever alternate offerings are being evaluated . . . and if price and output torque ratings are competitive . . . then the basic design approach of each manufacturer demands careful examination if you are to get full advantage of the savings that result from better performance, less maintenance and longer life.



Q. Are "dollars per horsepower" a valid basis for comparing mixer values?

A. No. Mixers having the same horsepower rating and drive efficiency can vary widely in torque rating. Torque applied to the mix is what does the work and torque is what you pay for. When comparing mixer values, the most important first step is that of developing torque ratings of alternate units offered. Using the most familiar units, torque can be calculated as follows:

$$\text{Torque (lb. inches)} = \frac{63025 \times \text{Motor HP}}{\text{Mixer shaft RPM}}$$

The mixer having the lower torque rating must use a higher mixer shaft speed and smaller diameter impeller to maintain a given HP level. This can lead to unsatisfactory performance. However, a mixer of equivalent horsepower rating but with a higher torque rating and larger impeller will do the job well. For an idea of the importance of impeller size, the chart shows the influence of impeller diameter in relation to tank diameter (D/T ratio) upon motor HP required for a specific level of performance in many industrial mixing operations. The bigger impeller at the slower speed (higher applied torque) will be a sounder choice.

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The FOREMAN'S PAGE

Pick the right materials

and prevent expensive plant shutdowns

Proper selection of materials for the various types of equipment in a refinery process unit contributes greatly to the success or failure of the unit's operation. Unwise selection of materials may result in equipment failure, causing unscheduled shutdown of the unit or restricting its throughput.

THESE SHUTDOWNS are costly in terms of materials and labor and in loss of profit from products not produced. Since most units are dependent on other units for feed stock, unscheduled turnarounds on one unit may result in curtailment of operations on other units.

Equipment failures may also result in fires which endanger personnel, destroy operating equipment, and curtail production. It is, therefore, important to select the proper materials to obtain long runs, low maintenance costs, and safe working conditions for operating and maintenance personnel.

Selection of material . . . Proper selection of materials of various types of refinery equipment and facilities cannot be made without some basic knowledge of the process involved. With each selection, these factors should be considered:

1. Temperature from highest to lowest expected.
2. Pressure from highest to lowest expected.
3. Type of material handled—abrasive or corrosive.
4. Is there a safety risk involved in equipment failure?
5. Relative cost of special materials compared to usual materials requiring normal replacement.

Temperature of material . . . The operating temperature is one of the main factors to be considered in the selection of materials due to its effect on the strength and service life. This is very important in a modern refinery where the temperature in equipment may range from —150° F. to 2,000° F. For use in selection of materials, temperatures may be classified as follows:

Low temperatures:
Below —20° F.
Medium temperatures:
—20° F. to 650° F.
High temperatures:
Above 650° F.

Commonly used steels are very strong in a steady pull even when subjected to temperatures below —20° F. but will break easily when hammered or given a sudden impact load. For these conditions, steels containing nickel, and small percentages of copper are used. For example, 3½% nickel steel does not become brittle until below —150° F., while 18-8 chrome nickel steel can be used down to —300° F. High copper and aluminum alloys have satisfactory strength at low temperatures but they are not safe for use in a refinery because when exposed to the heat of a fire they become very weak.

In the medium-temperature range the common metals such as cast iron, steel, copper alloys, etc. have their maximum strength and therefore a wide selection of materials is available for construction. Copper alloys and cast iron are used to resist corrosion. Cast iron is less expensive than steel and is used frequently where strength limitations permit.

This temperature range also includes such items as 150-psi. steel valves and fittings, steel pipe, steel plates, pressure-vessel steel, and structural steel.

The difference between cast iron and steel should be understood. Cast iron contains more than 1.7% carbon, is very brittle so it cannot be reshaped after casting except by machining, and it is very limited in strength. Steels with carbon contents from 1.7 to 0.35% have limited workability. Steels having less than 0.35% carbon content can be worked, forged, or welded and have very high strengths even at high temperatures.

This strength can be further improved by adding or alloying small amounts of other metals. Most of these metals are not well known because they have very little use as a pure metal but a little of one or more of these metals together with a small amount of carbon in iron makes alloy steels. Alloy steels are among the strongest materials known at medium or at high temperatures.

In the high-temperature range, carbon steels, alloy steels, and alloy cast irons—because of their high strength at high temperatures and their resistance to oxidation—are the preferred materials. The limit for carbon steel is about 1,000° F. The metals added to cast iron or steel for high-temperature service are usually chromium or nickel or the two together with smaller amounts of molybdenum, tungsten, manganese, silicon, titanium, and columbium, depending on the properties required in the alloy.

Special services such as tube hangers in a furnace can often be made of alloy cast iron. If both high strength and corrosion resistance are needed in tube hangers, then a high-chrome-nickel cast steel can be used.

Pressure . . . The operating pressure of the equipment is usually more important in the mechanical design of the equipment than for use in selection of materials. Company standards have set pressure limitations on the use of some materials for certain types of refinery equipment.

An example of this is a maximum pressure limitation of 250 psi. for use of cast iron in pumps, exchangers, and piping. These limitations are set due to the risks involved from failure of the cast-iron parts if subjected to shock or other abnormal conditions. Also there is a cost limitation for use of cast-iron parts due to the increased thickness required to withstand higher pressures.

This material taken from process-training-program manual, Baton Rouge, La., refinery of Esso Standard Oil Co.

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Blowout-prevention equipment

—be sure it's ready when the time comes

Five steps to blowout prevention . . .

FIRST, remember that the primary blowout prevention is the fluid column in the hole. Watching the mud ditch for gas showings may pay off in preventing an impending blowout. Filling the hole as pipe is pulled also is very important. Increase in velocity of the mud coming from the hole is an indication of pressure on the way up.

SECOND, each crewman should get regular practice and testing. If this duty is assigned throughout the crew on a regular rotating basis, everyone will have a chance to learn more of this vital equipment and use it better.

THIRD, put the blowout preventers and their auxiliary equipment into the rig-maintenance routine as quickly as possible after it is installed and tested.

FOURTH, use the service companies for information and advice on checking of equipment, problems with the blowout equipment, necessary maintenance, weak spots of the different types, and similar matters. This advice is free and can save much time and money, and maybe an accident.

FIFTH, impress on crews that they are cheating themselves by false reports of blowout-preventer tests. Supervisors should plan to be present periodically when crewmen are testing this equipment.

BY EUGENE C. PREHODA, JR.

MANY POTENTIAL ERRORS start during the flanging-up stage of blowout-prevention work. This phase of the drilling operation comes after the surface pipe is run and cemented. Crews and supervisory personnel are tired and perhaps not quite rigged up for the long drilling job ahead. This is the time accidents can and do happen. With a preplanned installation procedure, the work will proceed safely and quickly. This preplanned program should include the following:

1. A familiarization of the type of blowout-preventer hookup to be installed. Most oil companies provide drawings and details of their hookups. Remember to let the crew members in on it also. The more they know, the bettter they can do their job.

2. Visual inspection of the blowout-preventer units before installation. You can discover much about the internal condition of the units by visual inspection. Pay particular attention to such things as sealing surfaces, evidence of kelly cutting in the bore, condition of ring grooves, condition of stud and bolt threads, and internal cleanliness. This is the time to examine these parts since it is extremely difficult to examine them after they are in place in the cellar.

3. Supervised procedure in hoisting, handling, and lowering the blowout-preventers in the cellar. This type of equipment is very compact. As they are pressure vessels of large areas, they must have extremely thick walls. This makes the units very deceptive as to weight. Consequently, use care to select proper handling slings, etc. All personnel must stand clear of the direction the equipment would take if it should break loose. Individual pieces of this type of equipment weigh as much as 6 tons.

Use extreme care in lowering or raising the equipment through the table opening and into or out of the cellar. Table openings should be large enough to accommodate the largest piece of equipment without tilting or forcing it through. Crewmen should never stand in the cellar while equipment is being raised or lowered. They should stand to the side of the cellar and guide the equipment on or off the mating flange by means of lines attached to the equipment.

There have been many accidents while crewmen were in a cellar during raising or lowering of the blowout equipment. If the piece tips or strikes a table beam it may fall over and drop to the bottom of the cellar, crushing everyone in its path.

4. Protecting each unit from damage of exterior working parts or precise settings. This is heavy equipment; it is hard to be easy with anything so heavy. However, there are exposed parts which are vital to the safe functioning of the piece that are set within close tolerances. Learn these parts and pay particular attention to them during handling operations.

5. Close supervision of the bolting together of flanged faces. Ring-gasket seals should be new. Crewmen should be instructed in how to properly tighten flanges so they remain parallel to one another and bear on the ring seal evenly. Stress safety while men are working in the limited confines of the cellar.

Swinging a sledge hammer without regard to others working in the limited area can mean a serious accident. All flanges should be sledged up tightly so that no leak could occur below the preventers even at high pressures. Should a ring gasket become cut out because of pressure leaks, no amount of tightening will reseal it.

6. Installation of control wheels, valves, threaded connections, piping, remote controls, etc., after the blowout-preventers are in place. All items should be placed where they cannot be jammed or damaged by falling objects or equipment around the rig. Any blowout-preventer actuated hydraulically should be hooked up with seamless high-pressure pipe, never rubber hoses, and in a direction away from possible sources of rig fires that could heat the pipe and cause it to lose its hydraulic pressure. Hand con-

Author is general partner, California Oil Tool Co., Los Angeles. Paper presented at Western Oil and Gas Association-San Joaquin Valley oil-industry regional safety conference.

trols should never be closer than 25 ft. from the cellar and should have adequate shields to protect the operator from fire or falling objects.

Hydraulic controls should be in an easily accessible place and in line with one of the natural exists from the rig floor. All controls should be marked plainly as what they control and the direction of open and close. No controls should be within 25 ft. of the mud ditch.

7. Actuation and testing of the entire hookup after installation. It is a common error for the testing to be done by supervisory personnel, excluding the crew. Not only are the crew members the ones who need the training and familiarization with the hookup, but they are the most likely ones to actually have to use the experience in an emergency. Explain the functions of that particular hookup. And include the blowout equipment in the maintenance and housekeeping routine.

Keep parts free . . . There are a few basic troubles which are common to preventers and can interfere with their safe operation. If drilling sandy formation, pay special attention to sand settlings in the backwashes of the blowout-preventer cavities.

If rams become hard to open or close or piston-type bag packers do not fully close or open, chances are that sand has packed in and is restricting the movement of internal parts. If a good cleaning out does not remedy the situation, the unit may need mechanical attention. Actuating each blowout-preventer sometime during each tour will do more to keep the units from sanding up than anything else.

One of the most important routine practices is regular actuation and testing of each blowout preventer. This not only shows the effectiveness of sealing surfaces inside the preventers, but it also gives the entire system a chance to move. This applies to the simplest blowout preventer as well as to the most complicated hydraulic hookup. These tests check effectiveness of all parts and allow movement of parts that many times become rusted or bound by periods of long inactivity. Also, on these routine tests, have a different member of the crew open and close and check the system each time. This not only makes each crew member more familiar with blowout equipment, it also teaches him the location and actuation of controls. The crew that "doghouses" tests of blowout-prevention equipment endangers the safety of the drilling project and their own lives. Besides, they cheat themselves out of valuable knowledge and experience which can help them advance in their careers. An objective crew can not only assure safe blowout-prevention equipment, but can cut the time to perform the operation.

Make tests, check alignment . . . When testing blowout-preventers, make sure that the maximum pressure is held for at least a full minute with the valve from the source of pressure closed. This will allow time to detect any gradual pressure leaks. If the mud pumps are used as the pressure source, place a gage on the downstream side of the proper manifold valve. Many times sealing surfaces are damaged during drilling operations. Any pressure drop during testing will show there is trouble. For open-hole formations which cannot be pressured, there are tools to temporarily pack off in the surface casing while testing.

One important way to prevent internal damage to the pressure-control equipment is to make periodic checks of alignment of the blowout equipment with the rotary table. With modern portable rigs, settling of subbase portions tends to cause gradual misalignment during drilling. You can spot such misalignment by a simple check of the pitcher nipple opening in relation to the rotary-table master bushings. Use adjustable bracing to secure blowout equipment so that any misalignment can be corrected during drilling.

Maintenance must be routine . . . The more complicated the blowout-prevention system becomes, the more maintenance it requires. Hydraulically actuated equipment uses many moving parts, all operating at high pressure. Consequently, routine maintenance of lubricated plug valves, accumulator parts, remote-control pistons, and other equipment is of vital importance. If the system has electrical controls, they must be checked and maintained regularly. Bleed the pressure accumulator down until the automatic starting equipment energizes. Notice the pressure buildup. Check the electrical output of the generator system periodically for adequate voltage at the accumulator. Inspect the electrical cable to the accumulator and electrical controls for cuts or breaks. Keep loose equipment, trash, and rope, away from control stands, hand wheels, accumulators, and other parts of the blowout-preventer systems. This can be done during routine testing periods and will prevent the gradual accumulation of these hazards.

Blowout-prevention equipment is a specialized group and can be subjected to drilling damage. For that reason, periodic dismantling and complete inspection is vital to continued safe operation. Don't rely on it functioning until it breaks down, before overhauling or shopping for repairs. After each job the units should be opened, cleaned out, and visual inspection made of the interior. This is fairly simple in most of the later types of equipment and not too difficult in even the older types.

Check ram-type preventers carefully for the condition of the ram sealing rubbers. Check as well the pressure-sealing plate located in the top of the ram chamber. These can be eroded by small leaks when testing if the source of pressure is not shut off while pressure drop is being checked. Ram screws, or piston rods, packing, etc., should be visually inspected. Look at the ring grooves, studs, and exterior parts. Then the preventer can be greased, reassembled, and checked for actuation. This simple procedure will prevent installing a defective or cemented-up preventer on the next hole.

With "packing-element" or "bag-type" preventers, it is enough to remove the top (in the piston-actuated type), wash the interior, grease it, and reassemble it in the field. Inspect the seal rings on the piston at this time.

In the simpler pressure-differential types, a good washing and inspection of the packing unit is adequate.

These simple processes by the crews not only eliminate a lot of costly trouble, but they are also vital when equipment is carried from job to job with the rig.

Check rent equipment, too . . . If you rent blowout-prevention equipment, it is most important to inspect the equipment when it is delivered. All rented pressure-control equipment, since it is strange to the rig, should be accompanied by a certificate of a shop test before delivery. If there is no such evidence of test, the supervisor should demand it. The same inspection, routine maintenance, and testing should be followed as described above. Don't get the attitude of "Oh, well it isn't our equipment so what do we care." This is both dangerous and foolish.

When anything is rented, the renter is buying the use of it for a specified length of time. If through neglect or abuse, therefore, he damages the equipment, he must pay for the repairs just as though it were his own. By far the most important, however, is the fact that no matter whose equipment it may be, it must be maintained properly to perform its funtcion. The renter will help integrate the routine maintenance and testing of his blow-

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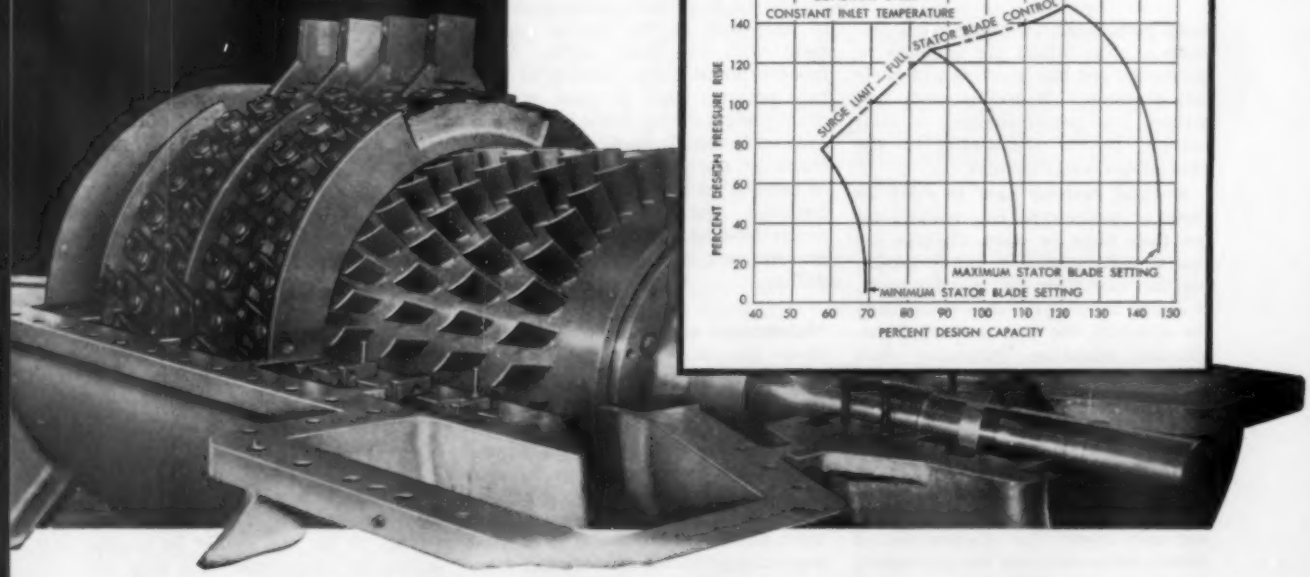

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With adjustable stator blade control, now available on Allis-Chalmers axial compressors, varying capacity needs can be met by merely changing stator blade settings — while the machine is in operation. Limited operating range need no longer be a problem.

In fact, Allis-Chalmers axial compressors can now be used with almost the same capacity variation as the centrifugal, while maintaining the axial's characteristic high efficiency and pressure rise at part load points.

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These additional advantages are inherent in axial compressor performance:

1. Because of the axial's wide range at constant speed, either steam turbine or motor drive can be used.
2. Small size, light weight of axial units cut space requirements, reduce foundation size and cost.
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A-5839

out equipment into the rig routine. In the final analysis, the blowout equipment is going to protect that rig and crew, so all equipment should be treated the same.

Check whole hookup . . . Many accidents have been caused by defective equipment installed below the blowout preventers. In many well-control hookups drilling spools must be fabricated to an exact height. Threaded outlets may be welded into these spools for kill lines, bean lines, and other lines. Once built, many of these spools remain in service over the years. The constant vibration of drilling can fatigue these fabricated units, causing cracks and leaks. Constant threading of nipples into outlets will wear or damage threads.

It is exremely important, therefore, to periodically test any equipment used below the blowout-preventers in a shop properly equipped for this purpose. Demand proof of test on any equipment you rent or order made up. Make preinstallation inspection of threads, welds, etc. The supervisor should check makeup and nipples and valves into the blowout-preventers, spools, and casing or tubing heads before pressure is put on the unit. These makeups are vital since there is no protection inside the first valve on a threaded hookup.

All blowout-prevention equipment should be sent to a properly equipped shop for complete inspection and cold-water test. This should be done after use on two holes (with crew maintenance between holes), or after 60 days, whichever occurs sooner. Damage builds up from the constant rotation of the drill string through the bore of the units. This damage can be remedied inexpensively and quickly by trained shop mechanics.

Watch completion, test tools . . . There is other pressure-control equipment to which drilling crews should pay careful attention. This is equipment used during testing and completing a well, such as lubricator valves, blowdown lines, and oil savers. These all deserve careful preinstallation inspection and careful assembly, since they will confine pressure. During this phase of operation improperly connected lines, leaky valves, or other faulty equipment have caused many accidents. Perhaps one of the most important items for careful attention is proper securing and tying down of lines to the sump. You may have witnessed a whipping line that has not been tied down or has broken loose. The job supervisor should closely check all these details before commencing operations. It pays big dividends in safety.

New back-pressure handbook will standardize recommended practices

IOCC manual on gas-well-potential testing may be published by next summer.

THE COMIC SIGNS, "Don't confuse me with the facts," and "There's no reason for it, it's just policy," would be right at home in the office of a gas-well test engineer.

Rules, regulations, and procedures governing the potential testing of gas wells lead to hopeless confusion where interstate problems are concerned.

A committee appointed by the Interstate Oil Compact Commission to study this problem is making real progress toward the development of standard procedures.

The group, known officially as the IOCC subcommittee on a manual for standard methods of testing gas wells, is made up of recognized experts in their field.

The need for such a study has been apparent for a long time. Nothing was done, however, until the New Mexico Oil Conservation Commission published its back-pressure manual. The New Mexico engineers were aware of the problem and also noted that preparation of such a manual by every state regulatory body would be a waste of manpower. They suggested that the IOCC enter the picture.

The new subcommittee was formed but not soon enough. The state of Kansas had a handbook in the mill, and it became an official document on July 15, 1958. Now, three states have published instructions: New Mexico, Kansas, and Texas.

The purpose of the subcommittee is to develop a manual for standard methods of testing gas wells and to standardize calculations. The manual can be used as a guide by states not having their own manual, and will serve as a source of information where modifications to existing manuals seem advisable.

The draft of the manual will be presented by the subcommittee to the Engineering Committee for its approval to publish. Target date for this presentation is December 1, 1958, at the IOCC meeting in Kansas City. However, the presentation will probably not be made until June 15, 1959, when the IOCC meets in New Orleans, La. Authority to publish will likely be automatic.

A literature search has been made to uncover all contributions concerning the subject. Personal experience of the committee members has been called on to supplement published data.

The committee is considering the separation of wells into two categories, on the basis of initial reservoir pressure. Experience has shown that flow tests on wells having initial pressures below 2,000 psi. can be calculated using average values for temperature and pressure in the producing string, while above 2,000 psi., the average values introduce errors that are not acceptable.

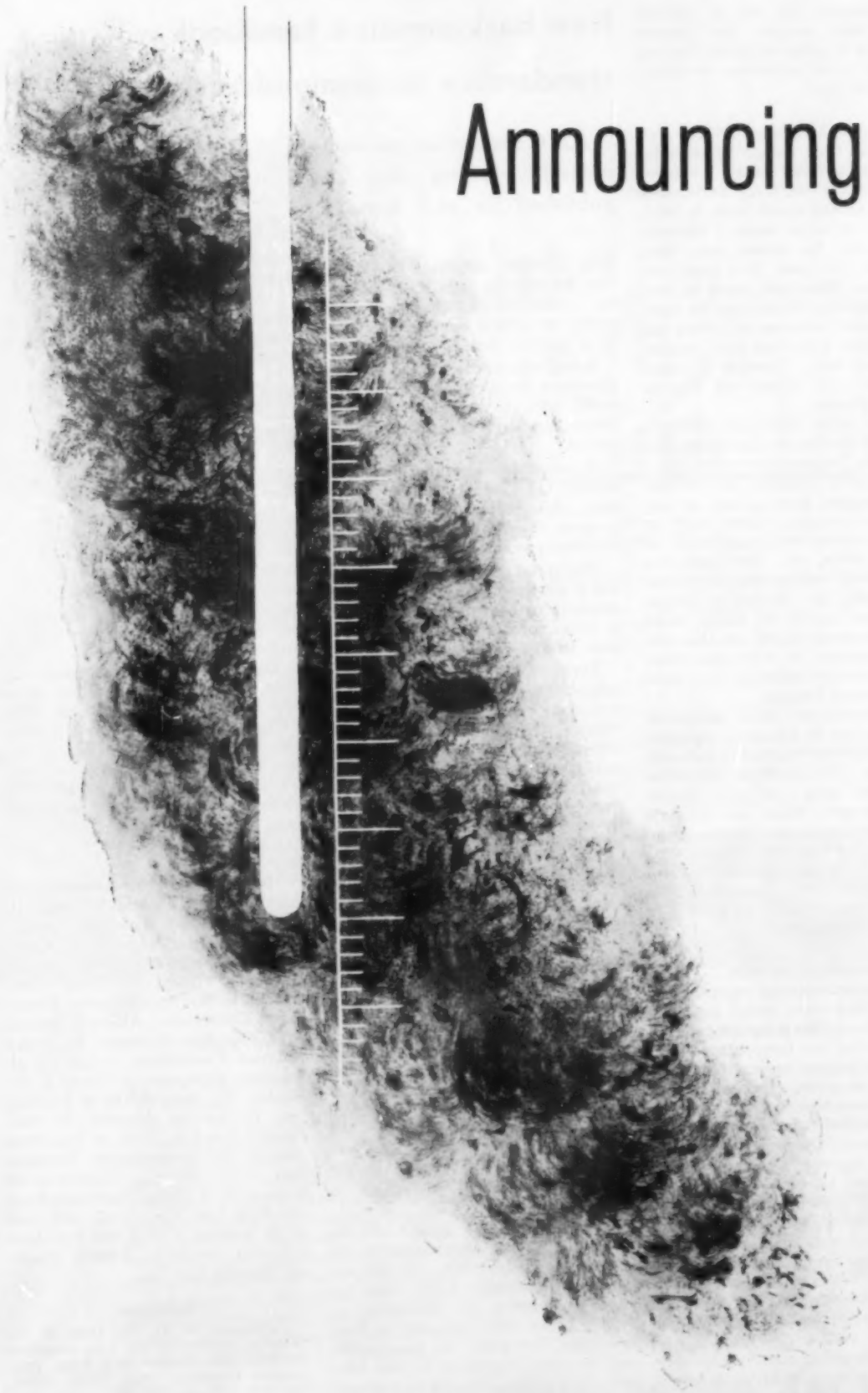
For this reason, calculations for the high-pressure wells will probably be made by using the method proposed by Cullender and Smith.[1] This method, or a modified version, will yield results which are considered superior to those obtained by using well-bore averages.

Differences in the pressure base used as standard by the various states has made the construction of tables difficult. Oklahoma, Texas, Kansas, and North Dakota are a few of those that use a pressure base of 14.65 psi. while California and the Federal Power Commission use 14.73. New Mexico, Louisiana, Colorado, Wyoming and others are on a 15.025 psi. pressure base.

Members of the subcommittee are: Alex G. Asseff, Duncan S. Cook, and O. T. Ice of the Louisiana Department of Conservation; B. C. Craft, Louisiana State University; M. H. Cullender, Phillips Petroleum Corp.; Charles E. Bowlin, Oklahoma Corporation Commission; Albert E. Sweeney, IOCC; John Cameron, Jr., Texas Railroad Commission; George H. Fancher, University of Texas; L. D. Woody, Jr., Humble Oil & Refining Co.; F. Norman Woodruf, El Paso Natural Gas Co.; Elvis A. Utz, New Mexico Oil Conservation Commission; C. F. Weinaug, University of Kansas; C. R. Horn, Panhandle Eastern Pipe Line Co.; J. C. Hill, and R. D. Burford, United Gas Pipe Line Co., and Gaston L. Tribble, Northern Natural Gas Co.

Reference

1. Cullender, M. H., and Smith, R. V., "Practical Solution of Gas Flow Equations for Wells and Pipelines With Large Temperature Gradients." Petr. Trans. AIME, Vol. 207, 1956, pp. 281-287.



Announcing...

USS 9% Nickel Alloy Steel

for the world's coldest applications down to -320°F

Nothing gets much colder than liquid nitrogen, which exists at temperatures of minus 320° F and below. At such temperatures, most container materials get brittle —lose their toughness.

To meet the need for an economical material that can be used for low-temperature pressure vessels, U. S. Steel is making an alloy steel containing 9% nickel. This steel is stronger, tougher and less expensive than other metals used for handling liquefied gases such as methane, oxygen, and nitrogen. For test purposes, plates in thicknesses of ¼ and ½ inch are ready for immediate delivery. Sheet sizes and heavier plates, as well as structural shapes, bars, and semi-finished products, are also available upon inquiry.

Higher Strength. USS 9% Nickel Steel can be furnished to meet all requirements of ASTM Specification A-353, Grades A or B. The ASME Boiler and Pressure Vessel Code allows a maximum working stress of 22,500 psi for 9% Nickel Steel. This is about 17% higher than allowed for other metals used for this purpose.

Greater Toughness. The toughness of 9% Nickel Steel has been well established in drop tests of actual vessels containing liquid nitrogen at minus 320° F. Charpy keyhole-notch impact values have been observed to be as high as from 31 to 38 ft.-lbs. at minus 320° F, from 73 to 84 ft.-lbs. at room temperature.

Weldability. Joints of 100% efficiency are possible with either manual or automatic welding in the inert gas metal-arc process. Suitable welding rods are available.

Weight Reduction. Greater strength permits USS 9% Nickel Steel to be used in thinner sections with substantial weight reduction. This is important for stationary storage and shipboard storage tanks for methane—and for other severe low-temperature storage applications.

Lower Costs. The steel itself costs less than competing materials by about 40%—and products such as tanks and heads can be made stronger with less material.

We urge you to consider USS 9% Nickel Steel for better, less expensive low-temperature vessels.

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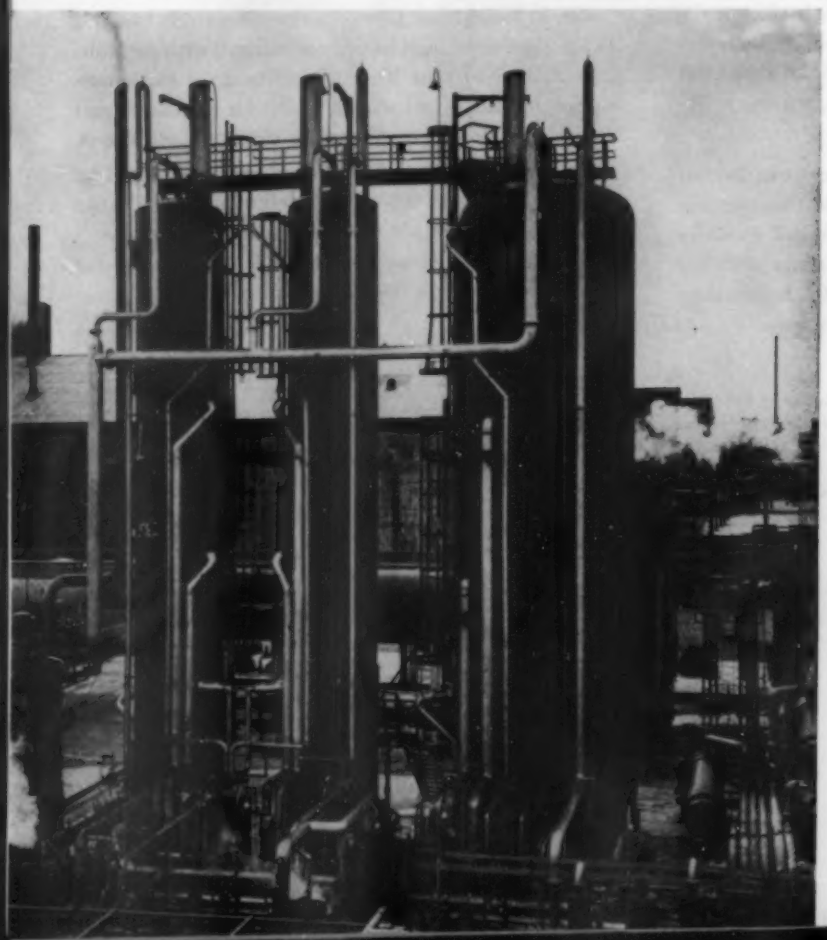
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

USS United States Steel

THREE-SECTION crude distillation tower. To permit economic construction of stripper shell the No. 2 fuel-oil stripper is located at bottom of tower and No. 4 fuel-oil stripper just above it. Three oxidizers are employed, shown below, operating either batch or continuous, to process asphalt into some 23 grades.



REFINING

New asphalt

This Cities Service plant near Linden, N. J., processes Boscan and Lagunillas crudes from Venezuela, Panuco crude from Mexico, and tar bottoms shipped in from other plants.

BY LARRY RESEN
Refinery Editor

THE PLANT'S four feed stocks are segregated in storage and then processed independently. Products and intermediates undergo segregation at various steps and in varying degrees, from separation in rundown facilities to individual storage tanks. Blending is another step where segregation of base stocks is required. Finally the storage of the 56-plus products realized at the plant requires numerous individual storage tanks and separate lines to prevent contamination of the many grades of asphalt made.

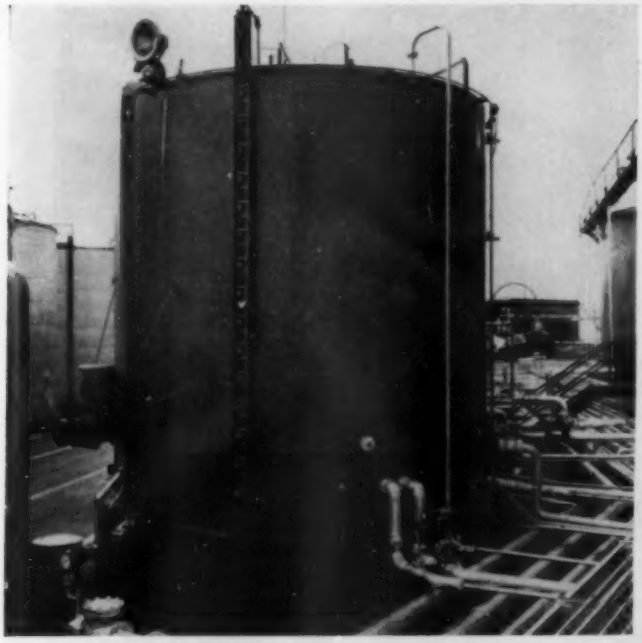
Asphalt production is a specialty business, and special care must be used in all phases of the operation. And in its new plant, Cities Service has incorporated numerous provisions so that the optimum yield of high-grade asphalts can be realized from the differing feed stocks.

Crude received at the plant via tanker and barge consists of four basic stocks. They are Boscan and Langunillas crudes from Venezuelan fields, Panuco crude from Mexico, and refinery tar bottoms shipped in from other plants. Most of the crude charged, however, consists of Boscan and Lagunillas stocks, with modest amounts of the other two materials run.

Analyses of the stocks are presented in Table 1, and the wide variance in their respective qualities can be easily seen. API gravities alone vary from 6.4 to 17.4, a difference of 11 points. These properties naturally result in different yields, and these are tabulated in Table 2 for the three crudes.

Processing conditions . . . Operation of the plant to accommodate these different stocks requires a wide swing in operating conditions, and to some

plant processes segregated feed stocks



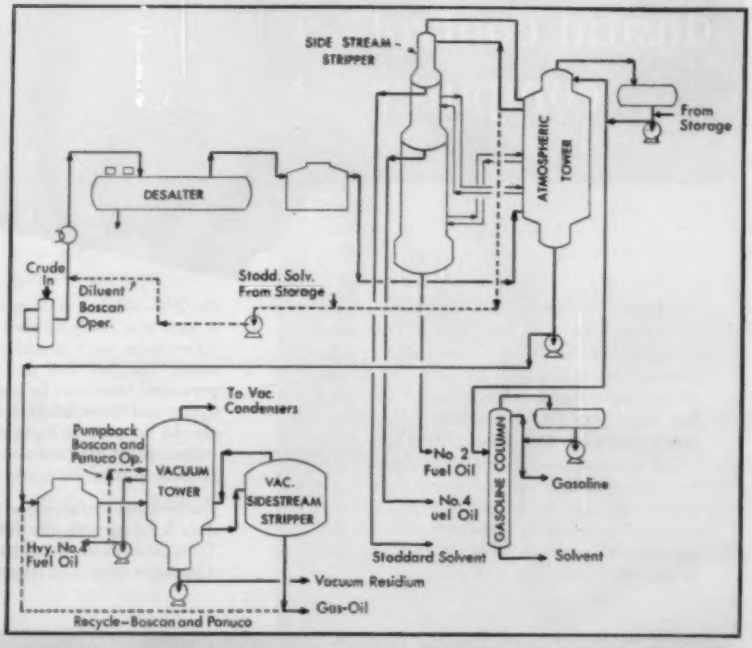
SLANTED TANK BOTTOMS are used to facilitate emptying of tanks.

BLENDING of many finished products and handling of different types of crude on segregated basis requires complex piping layouts.

extent a modification in processing. These can be appreciated by tracing through the process with a Boscan or Lagunillas charge. The Panuco and tar bottoms will fit in closely with the Boscan operation.

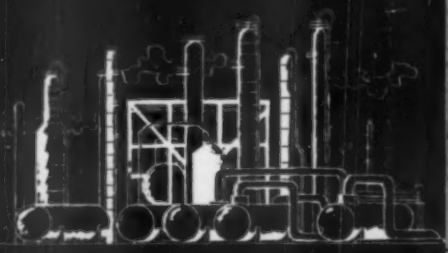
Initial process unit is the desalter, and here is the first place where a change in conditions is made to the crude streams. The Lagunillas crude is handled as any other desalter charge would be, and water and chemical are injected prior to its entering the electric desalter. However, when Boscan crude is used, a diluent is added to the crude charge to increase its gravity and make the operation more efficient. Naphtha from the atmospheric tower stripper is recirculated to join the Boscan crude at a point upstream of the desalting drum. Since this crude does not provide enough light ends to adequately lighten the charge, Stoddard solvent from storage is added to the recirculated naphtha.

Desalted crude is next charged to the crude tower, with sidestream products withdrawn at appropriate points. These will vary according to

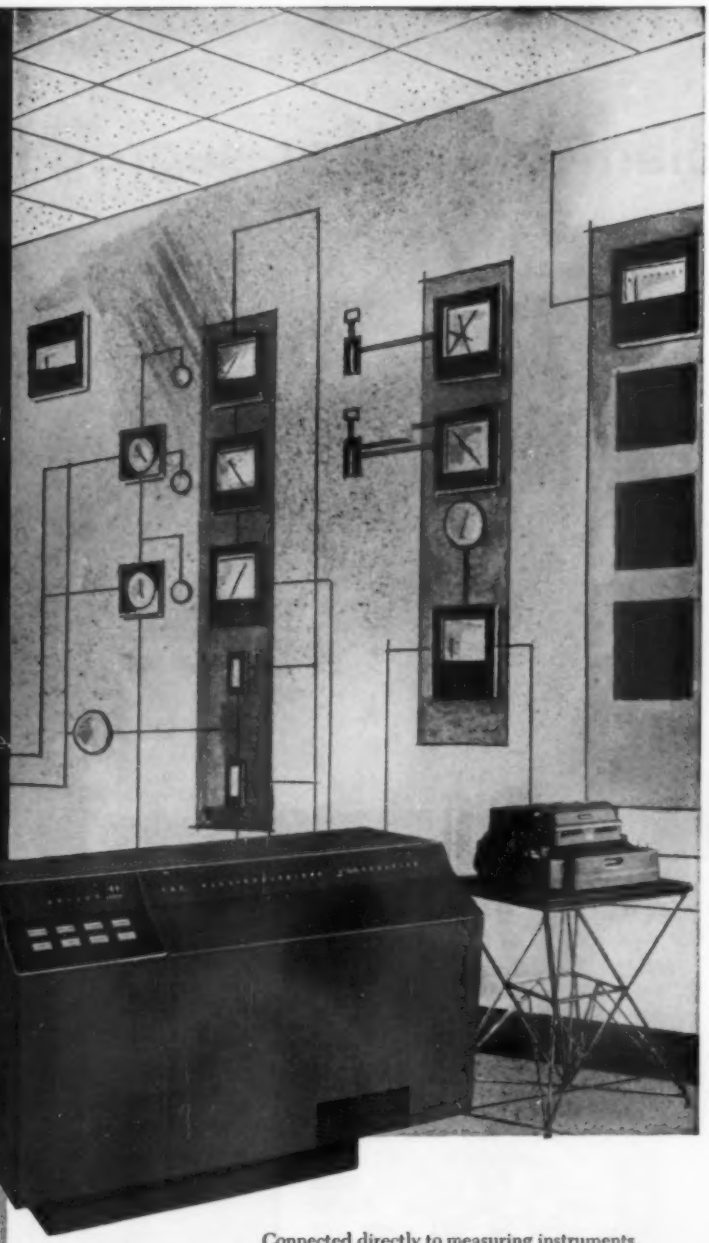


PROCESSING SCHEME for the Cities Service Oil Co. plant located near Linden, N. J. Processing conditions are varied to some extent depending on type of stock charged.

advanced
data logging



...with the
RW-300
digital control
computer



The Ramo-Wooldridge RW-300 Digital Control Computer—the first digital computer designed specifically for automatic on-line process control and data logging—offers significant advantages as the heart of advanced data logging and scanning systems for oil refining, chemical, and other process industries. Unlike conventional data loggers, the RW-300 can be converted to completely automatic control through a minor field modification without purchasing expensive additional equipment and without scrapping any part of the existing logger.

Connected directly to measuring instruments, the RW-300 can do more than log raw or partially processed data. It can also compute and immediately print out more meaningful information such as yields, conversion efficiencies, and energy balances. The RW-300 can also calculate operating guides for plant personnel to follow. In addition to checking process variables against upper and lower limits, the RW-300 can perform more sophisticated checks on process equipment and the process itself. These checks reduce plant maintenance costs by detecting faulty operation of the process in time for corrective action.

For technical information on automatic process control and advanced data logging with the RW-300, write: Director of Marketing, The Thompson-Ramo-Wooldridge Products Company, P. O. Box 90076, Airport Station, Los Angeles 45, California, or call OSborne 5-4601.

THE THOMPSON-RAMO-WOOLDRIDGE PRODUCTS COMPANY

A CIRCULATING HOT OIL SYSTEM is used to maintain temperature in most of the insulated storage tanks.

the crude. When Lagunillas is the charge, the top sidestream will be Stoddard solvent, the next No. 2 fuel oil, and the third light No. 4 fuel oil. With Boscan crude as the charge, the top sidestream will again be Stoddard solvent, the second No. 2 fuel oil, and the third a heavier No. 4 fuel oil. Under normal operating conditions, the No. 2 fuel oil from Boscan operations will be sent to No. 4 fuel oil storage. However, the tower will still be operated to make a sidestream with No. 2 fuel-oil gravity.

An interesting feature here is the three-section sidestream tower. Ordinarily, the stripping sections will be positioned corresponding to the location of the tower drawoffs. However, to permit economic construction of the stripper shell, the No. 2 fuel-oil stripper is located at the bottom of the tower, while the No. 4 fuel-oil stripper is located just above it.

Pressure-temperature . . . Operating conditions vary in the atmospheric tower, typically being 215° F. at 4 psig. with Lagunillas, and 235° F. at 13 psig. with Boscan at the tower top. An even greater disparity in conditions exists in the vacuum tower. Here the operating conditions are 175° F. at 55 mm. Hg and 200° F. at 130 mm. Hg, with Lagunillas and Boscan, respectively. Of course, the conditions will be varied from these depending on penetration and melt points being sought for the finished asphalt.

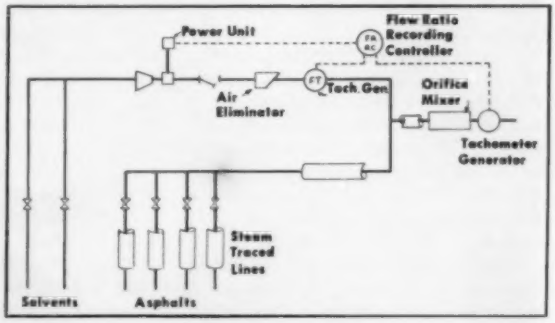
In the vacuum tower there are two variations with the two different crudes. At intermediate reflux stream is used in the midsection of the tower. When Lagunillas crude is run, this stream is cooled before entering the tower, exchanging heat with the crude-feed stream. When Boscan is charged, the intermediate reflux is not cooled. Instead it is pumped directly to the intermediate reflux tray from the chimney tray.

Heavy gas-oil is withdrawn as a sidestream from the tray just above the flash zone. When Lugunillas crude is in the unit, this sidestream

TABLE 2—TYPICAL YIELDS
(Wt. % based on 100 Pen. asphalt)

	Boscan	Lagunillas	Panuco
Naphtha	3.0	7.0	5.0
No. 2 fuel oil	12.0	20.5	16.0
No. 4 fuel oil	8.0	23.5	12.0
Asphalt	75.0	47.9	65.0
Loss*	2.0	2.0	2.0

*To allow for water and other losses.



DISPLACEMENT METERS are used in blending operations. There are four automatically controlled continuous blending stations for solvents, asphalts, high-flash and low-flash cutbacks.

TABLE 3—TYPICAL YIELDS
(Based on 60-Pen. asphalt)

	Boscan crude Crude assay		Lagunillas crude Crude assay	
Stream—	t.b.p., °F.	B/D	t.b.p., °F.	B/D
Crude tower o.h.	t.b.p.-310	250	t.b.p.-310	784
Stoddard solvent	310-385	180	310-385	420
No. 2 fuel oil	385-650	*1,620	385-650	2,898
No. 4 fuel oil	650-770	1,080	650-810	2,156
Heavy gas oil	.....	.....	810-935	1,540
60-pen. asphalt	770 +	8,870	935 +	6,202
Crude feed	.....	12,000	.....	14,000

*Normally blended with No. 4 fuel oil.

TABLE 1—CRUDE SPECIFICATIONS

	Boscan	Lagunillas	Panuco	Tar bottoms
API gravity	10.0	17.4	11.5	6.4
Specific gravity	1.0	0.9503	0.9895	1.0261
B.s. and w.	1.4	1.8	1.9	.....
Pour point, °F.	55	—5	30	20
Sulfur, per cent	5.617	2,150	5.342	1.14
Furol, at 122° F.	2500+	.....	768	141
Furol, at 150° F.	802	66	.....	.....
Salt, lb./M bbl.	50.1	11.3	246.5	.....
Flash point, PM, °F.	140	60	102	158+W
Flash point COC °F.	150+	110	140	.....

flows to the heavy gas-oil stripper where it is stream-stripped prior to going to storage. With Boscan crude, the sidestream flows through the stripper, but no stripping takes place. Instead, the gas-oil stream is recycled through the vacuum heater with the fresh feed to the tower. The recycling helps reduce coke formation by insuring a positive flow of liquid on the trays just above the flash zone.

Vertical oxidizers . . . The oxidizing section of the plant uses three vertical oxidizers to process the asphalt into about 23 different grades. These are operated under either batch or continuous conditions. In the first instance, a schedule with cycle times has been set up for the oxidizers. This simply involves filling the vessel, blowing air into it for a predetermined time, testing the contents to see they meet specifications, and then emptying. This varies from 5 to 16 hours with the two 250-bbl. vessels and from 7 to 13 hours with the 1,000-bbl. oxidizer.

The spread is determined according to how much time is required to blow the asphalt to meet specifications. A longer blowing time increases the softening point. Under continuous operations, the pumping rate and air blowing rates are set up so the asphalt is exposed to a sufficient volume of air to achieve the desired results.

Asphalt oxidation is an exothermic reaction, and cooling is required to maintain temperatures within limits. This is accomplished by use of a proportioning pump which injects water into the oxidizing air stream to cool the oxidizer contents.

This injection rate is rigidly controlled and the small amount used makes this a satisfactory method for cooling the vessels. Smothering steam is admitted continuously to the vapor space whenever an oxidizer is in service. A connection is used to tie in with a 150-lb. steam system. An orifice in the steam line is used to estimate the steam flow. A bottom steam connection is also used to permit steaming-periods when making laminating-grades of asphalt.

The oxidizing section has a capacity to produce more than 80,000 bbls. of oxidized products per month.

Blending . . . Four automatically controlled, continuous-blending stations are installed. These are used for: (1) solvent blending; (2) asphalt blending; (3) high-flash cutback blending; and (4) low-flash cutback blending. Each station is capable of blending only two streams at a time. Stocks from the tankage area pass through 11 headers; 5 for base-grade asphalts, 5 for solvents, and 1 for heavy gas oil. Oxidized stocks flow to the blending area from the oxidizers through a separate header.

Displacement meters are used to determine flows on two of the three streams involved at any one blending station. A meter is used to measure the rate of flow on the outlet stream. This is the combined flow of the two blending streams. A second displacement meter is used to measure the flow in one of the inlet streams. Each of the meters transmits an electrical signal to a flow-ratio controller. This instrument then compares the signals from the two meters and controls the flow in the metered inlet stream to maintain a constant ratio between the outlet and inlet flow rates, thereby obtaining the desired blend.

A circulating hot-oil system is used to maintain desired temperatures in the storage tanks. Fired heaters are used to heat oil to 600° F., and this is circulated throughout the tank farm to maintain a temperature of about 400° in each tank. The tanks are designed to handle different products and the coil installations vary according to the product due to be stored. Steam is used as the heating medium in the cutback asphalt tanks. Since these products do not require such high temperatures to maintain pumpability, the 150-lb. steam is satisfactory. Many tanks are elevated to permit gravity loading and have slanted bottoms to facilitate evacuation.

The Cities Service plant was designed, engineered, and constructed with C. F. Braun & Co. as the prime contractor.

Acknowledgments . . . Cooperation of the management of Cities Service Oil Co. in the release of this information and the assistance of Ed Southard, process superintendent, Linden, and G. A. Matte and B. G. Davis, New York, are gratefully acknowledged.

BOOKS

CHEMICAL PROCESS ECONOMICS. By John Happel. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16. 291 pp. $8.50.

This book covers general principles, practical information, and application of the solution of process problems involving economic alternatives. Problems involving selection of new equipment, design of process plant components, and operation of existing plants are all handled by means of the same basic relationship. A mathematical development is made of these relationships.

A comprehensive coverage of economic balance is offered including present techniques and their application. The quantitative consideration.

A special feature of the book is the appendix devoted to rules of thumb for the practical design of chemical plants based on the experience of many engineering firms. This enables the determination of reasonable answers quickly when there is insufficient information to justify detailed consideration.

RESEARCH MANAGEMENT. Published by Interscience Publishers, Inc., 250 Fifth Avenue, New York 1. $7.50 per year.

This quarterly, issued by the Industrial Research Institute and Interscience Publishers as a joint undertaking, is devoted to discussions and elucidations of problems in the field of research managements.

Industrial research is a 6-billion-dollar activity, employing over 500,000 people in some 5,000 laboratories. The proper organization and management of research presents many problems which are of common interest to managers in widely different fields.

Such problems include: organization and functional operation of research departments; design and construction of laboratories; personnel selection, training, compensation, and maintenance of morale; creative thinking; project selection, scheduling and control; evaluating the results and selling research to management; budgeting and accounting; and the integration of research into the company's operations.

Nelson Refinery Construction Index

Appears in the Engineering Section in the first issue each month.
Compiled by W. L. Nelson, petroleum refinery consultant, Tulsa.
The Index was explained October 1, 1956 (page 110), as well as the Indexes of Individual Items of Equipment that appear on the Costimating Page in the first issue of the months of January, April, July, and October.

Index (1946 = 100)

	1950	1954	1955	1956	1957	Aug. 1958
Pumps, compressors, etc.	138.2	166.5	172.2	192.0	206.7	212.4
Electrical machinery	134.9	160.0	162.5	175.0	188.9	193.6
Internal-combustion engines	126.0	150.5	153.2	164.0	173.9	178.9
Instruments	127.8	154.6	162.9	182.1	187.4	197.0
Heat exchangers	140.0	171.7	156.8	190.7	203.6	174.2
Misc. equipment average	*126.2	160.7	161.5	180.5	192.1	191.4
Materials component	149.5	174.6	176.1	190.4	201.9	205.2
Labor component	144.0	183.3	189.6	198.2	208.6	223.0
Nelson construction index	146.2	179.8	184.2	195.3	205.9	215.9

*Used in computing the Nelson Index until April 1952. This is slightly different from the average of the Miscellaneous Equipment Items shown above.
†Preliminary.

"U. S. Army photo shows Jupiter-C rocket just before launching."

Rockets Get a Lift From Sinclair

by W. M. FLOWERS
President
SINCLAIR RESEARCH LABORATORIES, INC.
a subsidiary of

"Launching rockets is a tricky business. They are intricate almost beyond description, and a breakdown of any critical part can cause the whole rocket system to fail. We are proud to report that critical parts in the type of rocket motor which launched the U. S. satellites *are protected by a new Sinclair product.* This is a specialized lubricant developed by Sinclair research to solve a serious problem perplexing the rocket scientists. *The same product is being used in the government's missile development program.* As contributors to the American advance into space, we say in all seriousness, 'Sinclair lubricants are out of this world.' "

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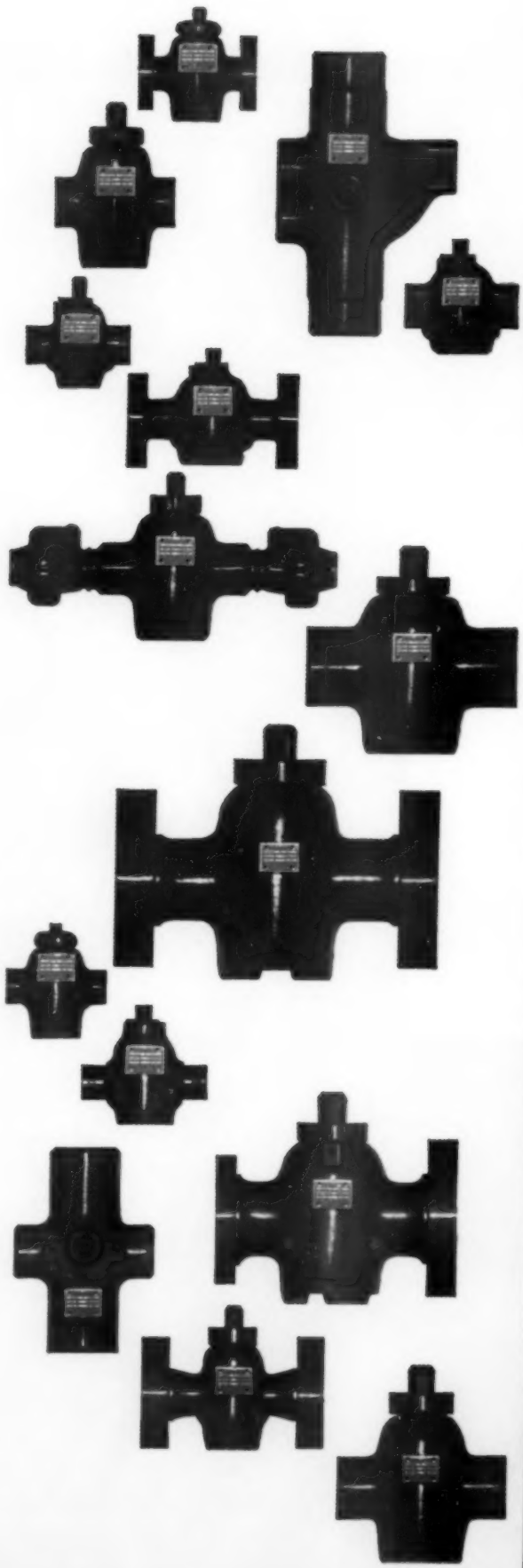

Line pressure seals Mission Valves. Sealant is applied automatically under pressure from the line product itself. Because of this positive seal, leaks are literally stopped before they start. Yet, because of the split cylindrical rotating gate design, there is no wedging, no sticking, as in conventional plug valves.

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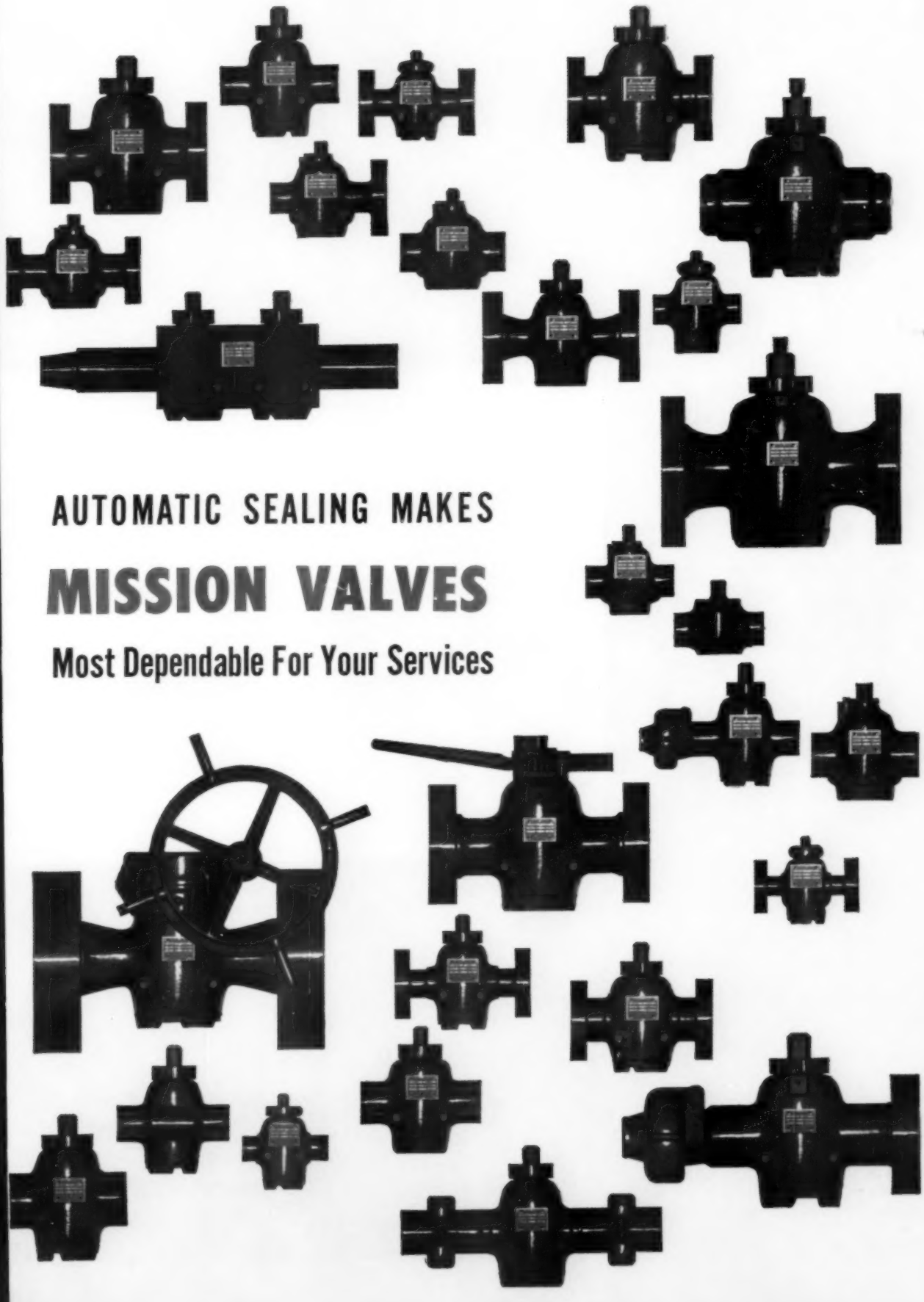

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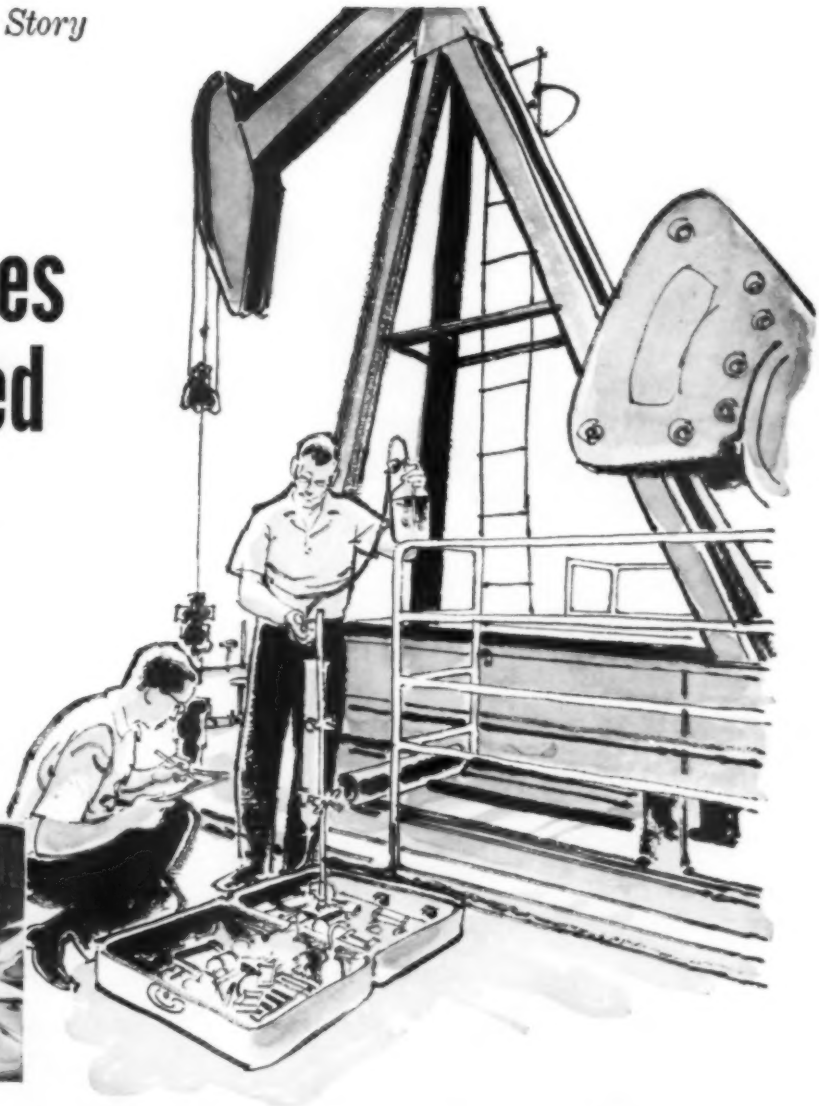
with an important demonstration for secondary oil recovery operators



The man you see above is one of 20 young chemical engineering students who have, since June, conducted an unusual "flow rate" demonstration for secondary recovery operators throughout the Southwest. It's all been part of *Program 20,* inaugurated by Chas. Pfizer & Co., Inc.

Conclusive Proof of Citric Acid Effectiveness

In more than 4 out of 5 tests, conducted at the well head, citric acid significantly improved water injection flow rates. Program 20 representatives were able to demonstrate graphically citric acid's remarkable ability to sequester iron salts preferentially thus *preventing "iron plugging" of the sandface.*

If water flooding is your business, and you were unable to invite a *Program 20* man for this demonstration, you can still write to the Pfizer Chemical Sales Division in Brooklyn and arrange for a Pfizer representative to visit your well head with the water quality kit.

He will also give you information on the use of citric and gluconic acids with detergents in well clean out procedures, and information on the use of these same acids in HCl acidizing.

Test and Data are Free!

He will leave you a complete and valuable test report plus a Fact File that includes comprehensive technical information and research data for secondary oil recovery. Why not take advantage of this unusual opportunity?

Chas. Pfizer & Co., Inc.
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PROGRAM 20

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Atlanta, Ga.; Dallas, Tex.; Clifton, N. J.

This unmanned remote platform . . .

is operated from here as . . .

Phillips saves money with remote control

TRANSPORTATION of men, materials, and crude oil by barge is often made dangerous or impossible by bad weather and high seas. The wells must frequently be shut in for lack of storage space, and the switcher cannot always board the well platform.

Phillips Petroleum Corp. is using remote control and telemetering in the operation of its Eugene lease in Block 129A of the Eugene Island area, 80 miles southwest of Morgan City, La.

Presented at AIEE petroleum-industry conference, Dallas, under the title, "Electric Power and Remote Control for Offshore Oil Production on Phillips' Eugene Lease."

BY R. W. ELLIOTT
Phillips Petroleum Co.

Central platform . . . Power is generated on one platform and carried to the other platforms by submarine cable. This cable also carries conductors for telephone, telemetering, and control functions. From this central platform the switcher can:

- Open, close, or change the production rate of a well.
- Read tubing and header pressures.
- Control chemical pumps, fog horns and lights.
- Put any well on test.
- Phone the tank battery and well platforms.
- Communicate with boats and the Morgan City office by radio.

The system is fail safe and has automatic alarms and shut-ins. It can be expanded to handle additional functions.

The advantages of this system are:

1. Fewer operating personnel and fewer trips to well platforms are required.
2. It can operate normally during high seas.
3. Electric power is available on well platforms for wire-line units, foghorn compressors, cranes, pumps, and other facilities.
4. Considerable savings in pipelines through the use of trunk lines rather than individual flow lines.

Central tank battery . . . Production from each of the multiple-well platforms goes to a centrally located platform where all separation, storage, and testing facilities are located. A common 6-in. trunk line is used for all wells from each platform. This line is paralleled by a 3-in. well-test line. The oil is periodically loaded into barges for transportation to shore, and the gas is vented.

A quarters platform is located 100 ft. from the tank-battery platform and the two are connected by a walkway. The quarters platform provides housing for the operating personnel and for lease remote control, telemetering, and electric-power generating equipment.

Electric power generation . . . Three-phase 480-volt 60-cycle power is generated by two 125-kw. and one 150-kw. generators. The 125-kw. machines are driven by gas engines with gas-engine starters. The 150-kw. machine is driven by a turbocharged diesel engine which is started by lead acid batteries and serves as an automatic-start standby unit. A continuous supply of electric power is important because the wells automatically shut in when power fails. If production is suddenly stopped, there is danger of sand settling out and plugging the tubing in some wells. Two sources of power are also required for foghorn-motor operation.

Fuel gas for the two gas engines is taken from the tank-battery separator gas-vent line. The gas passes through a scrubber, gas guard, and pressure regulators before it enters the volume tanks mounted on the generator-unit skids. The main diesel-fuel tank is on the tank-battery platform. Diesel

fuel gravities into a small day tank which is located beside the generator building. Fuel level in the day tank is automatically controlled by a float and solenoid valve. A second float actuates the alarm system if the day tank becomes too full.

Automatic power supply . . . The control system for shutting down the generators and automatically starting the standby generator is powered by a 24-volt nickel cadmium battery. This system uses only simple relays and switches. It will shut down any of the engines on high water temperature, low oil pressure, low fuel pressure, or overspeed. The gas engines are shut down by grounding the magnetos.

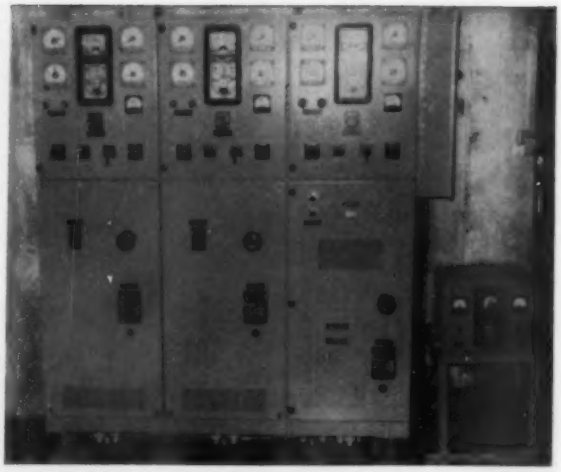
The diesel engine is shut down by a solenoid in the governor which closes the fuel rack when the solenoid is deenergized. The generator circuit breaker and a breaker serving nonessential load are tripped automatically when an engine is shut down. The nonessential load is the quarters-building equipment which averages 30 kw. If the gas-engine units are running in parallel and one is automatically shut down, the diesel unit does not start if the remaining gas-engine unit will carry the load.

If the second gas engine is not running or if the voltage drops below 80% of normal for 5 seconds, the diesel unit will start and come up to rated speed; the gas engine will stop, its generator circuit breaker will open, and the diesel unit's load contactor will close. This automatic starting and transfer of load to the diesel unit takes 8 to 12 seconds with the present relay settings.

Approximately half of this time is required for the diesel engine to start and come up to speed. Automatic paralleling and reverse power relays are not used. The control battery and the starting battery are each float-charged by automatic battery chargers which adjust their charging rate every minute. The diesel-unit shutdown solenoid is energized when this unit is running. With the exception of this small load, there is no drain on the control battery except during the time an engine is being stopped.

The alarm panel for the generator engines is located in the control room. It contains an amber light, a reset toggle switch, and a test button for each alarm point. The alarm is sounded by a bell in the control building and by two horns on the quarters platform. The red light on the panel indicates which point initiated the alarm. The test button will also initiate an alarm and is used to check the operating ability of each point. The reset switch is used to silence the bell and horns, but the red alarm light cannot be turned out until the alarm-initiating contact has been opened.

GENERATOR panels, control battery, and battery charger in control room.



The alarm points for high water temperature, low oil pressure, and low fuel pressure are set to give an alarm before the automatic shutdown system stops the engine. Thus, the operator is warned that a dangerous condition is developing, and he can take steps to remedy the situation before the engine shuts down. A number of spare points were provided on the alarm panel so that additional alarms can be added when and if they are considered necessary.

Explosionproof equipment . . . All of the tank-battery platform was classified as a Class I, Group D area requiring explosionproof electrical equipment. The motor-operated valves on the well platforms are also explosionproof. The remainder of the electrical equipment enclosures are watertight or weatherproof, depending on where they are located and what they enclose.

The circuit-breaker distribution panel board for all electrical loads is located in the control room. There is an explosionproof distribution panel for the various 120-volt lighting circuits on the tank-battery platform. The quarters building also contains a circuit-breaker distribution panel for the 120/208-volt loads in the building. Each well platform has a unitized circuit-breaker distribution panel for the load on the well platform.

Unitized design . . . As far as was practical, all electrical switchgear was built in unitized packages which were installed and secured in the various buildings onshore. This was done to minimize the handling and wiring required offshore. The well-platform buildings were built on skids and the transformers, cable-termination potheads, fused disconnects, circuit-breaker distribution panel, and supervisory control equipment were all mounted in the buildings at the marine base at Morgan City.

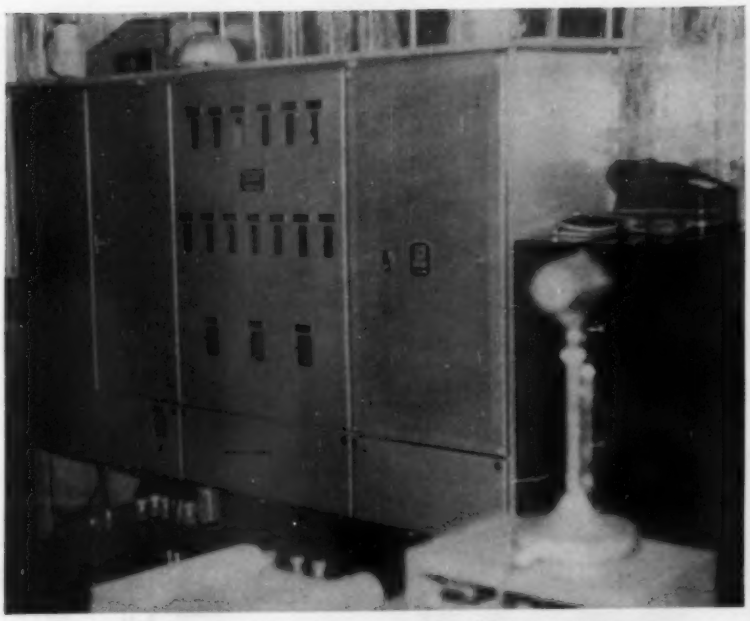
These buildings were then barged to the well platforms and each was set in place with one lift of the crane. Since all the equipment in the building had been completely wired, the connection of the external cables to the proper terminal strips completed the hookup in the well-platform buildings.

The lights and all wiring were installed on the tank-battery platform deck section before this unit was moved offshore. The complete quarters building, the generator building, and generator units were installed on the deck section of the quarters platform in the shipyard at Morgan City before it was moved to the lease.

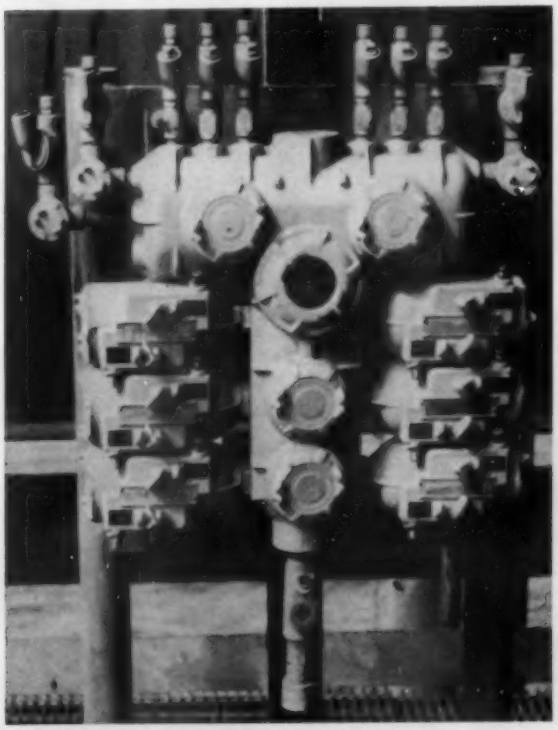
Supervisory control and telemetering . . . All relay, code-type supervisory control equipment is used. This is a select-and-operate pulse code system with an eight-step counting chain, which operates on 48-volts d.c., supplied by a rectifier. All telemetering is done with an impulse duration system using a 5-second transmitting unit. All telemetered values are on a select-and-read basis. None are recorded or indicated continuously and only one value at a time can be read.

Two separate supervisory control systems are initially installed. One was equipped for 57 control points to serve one multiple-well platform and 10 wells. The other was equipped for 25 control points to serve 2 platforms and 3 wells. Each control system can be expanded to 120 control points. The remote-station equipment has not been installed for the 10-well system because the anticipated wells have not as yet been developed.

The two supervisory control master-station panels are located in the control room on the quarters platform. These panels each contain three tele-



CIRCUIT-BREAKER distribution panel for all electrical loads.



DISTRIBUTION PANEL for tank-battery platform is explosion-proof.

meter receivers and the key-and-lamp group for each supervised point. The telemeter receivers have scale ranges of 0 to 500 psi., 0 to 3,000 psi., and 0 to 10,000 psi. Each telemetered pressure is connected to the proper range receiver.

A red and a green light continuously indicate the position of each controlled device and an amber light indicates that the supervisory equipment has selected the desired device and is ready to operate it when the common close or trip button is pushed. If the position of any controlled device changes without being directed to do so, an alarm bell rings in the master-station control panel and the proper red or green position-indication light on the key-and-lamp group flashes on and off to show which controlled device has changed.

The supervisory control relays are enclosed in waterproof cases. Electric heaters keep the temperature inside the case higher than the outside temperature. This prevents water condensation inside the case.

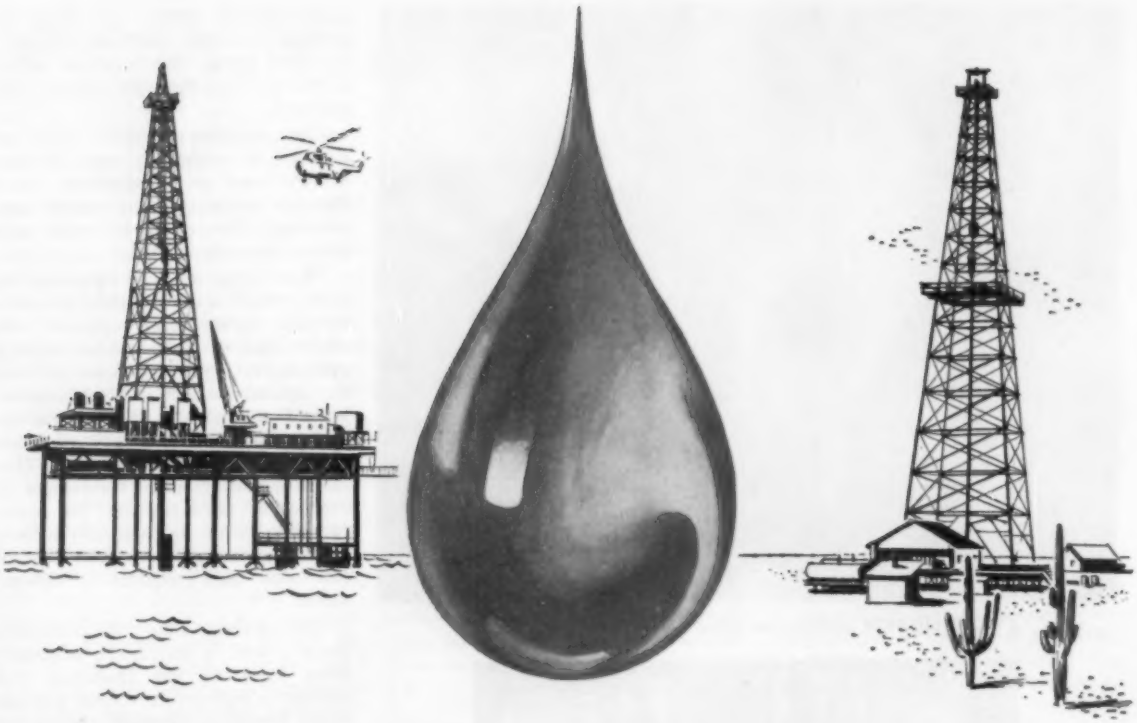
Three types of valve operators are used. They are the electric-motor-opened, spring-closed operator; the electric-motor and hydraulic-pump-opened, spring-closed operator; and the operator which is electric-motor-opened and closed. All of the operators have hand wheels to allow manual operation of the valve. They all have limit switches for remote indication of valve position. The operators that do not automatically close if electric power fails are used only on one well that requires 10,000-psi. valves.

The normal flow of production from a well is through a controlled wing valve on the christmas tree; through a high-pressure sand trap and water knockout; through one of two paralleled controlled valves and positive chokes; and then through a controlled three-way valve to either the production or test header and the pipeline to the tank-battery platform. Telemeter pressure transmitters are connected by cooper tubing to the tubing at each wellhead and to the production and test headers.

High and low-pressure mercury switches on the sand traps and the headers automatically shut the controlled valves if the pressure rises above or falls below their set point. The circuit for the low-pressure mercury switch on the test header can be opened remotely. This allows remote startup of a well platform after it has been shut in and the pressure is reduced in the lines and vessels.

Each platform has an electric-motor-operated wire-line unit for scraping paraffin and running tools in the tubing of the wells which are all permanent completions. The foghorns are special remote-controlled electric-motor-powered units which replace the standard dual-diesel foghorn package. These new units require only a 30-in.-diameter circle of platform floor space.

When they are mounted on the top of the 30-in. pile at the corner of a well platform, the unit actually uses only 1.2 sq. ft. of usable floor space. This unit consists of a motor, starter, air compressor, and standard timer and air horns all mounted on top of a vertical air tank. It is Coast Guard-approved and makes the same noise



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as other 2-mile foghorns. The switcher can turn any of his foghorn units off or on from the control room on the quarters platform. He can also monitor their operation through the use of a supervisory point which connects a microphone on the well platform to an earphone at the control panel.

Operating experience and troubles . . . Considerable expense and delay, but only minor damage, was caused by two hurricanes last year on the Eugene lease. One occurred during construction and the other happened after most of the equipment was in operation.

The remote-control and electric-power system has completed a year of satisfactory operation. The expansion of the system depends on further drilling and development on this lease.

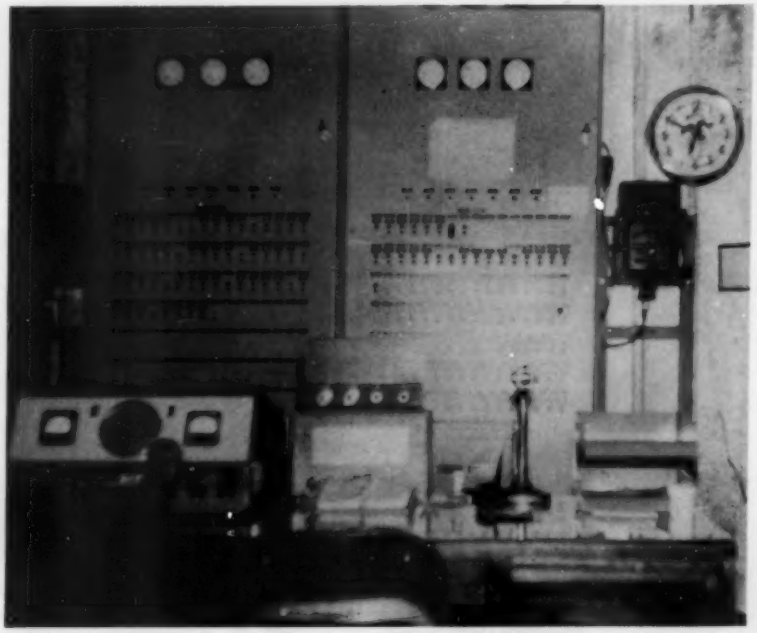
There have been some minor troubles and failures in the system, but in general the plan has worked without major faults and no lost production due to down time.

There has been no failure of relays or relay contacts in the supervisory control equipment. The only failures in this equipment were two badly soldered connections and two cases of poor contact on a plug-in socket. Corrosion and condensation have not caused trouble.

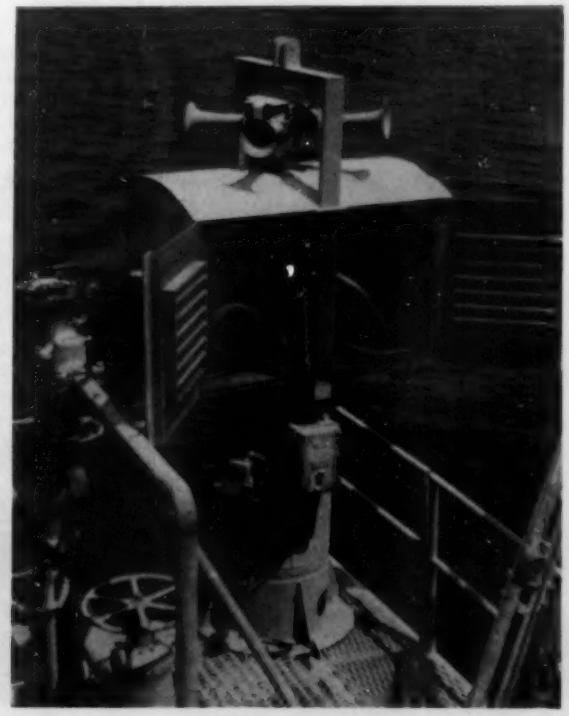
It has been necessary to modify the limit-switch-actuating mechanism in the motor-opened, spring-closed valve operators in order to obtain positive-valve position indication and motor shutoff when the valve reaches the full-open position.

The generation, distribution, and switchgear equipment has been almost completely trouble-free. The thorough training and instruction of field personnel in the operation and maintenance of the generator units and all of the other electrical equipment has helped in preventing malfunctions and down time.

Much experience has been gained on the Eugene lease in offshore production methods which will come into more general use in the future.



SUPERVISORY-CONTROL master-station panels and switcher's desk in control room.



TWO-MILE FOG HORN is motor-operated and remote-controlled.

CASES for supervisory control relays are waterproof.

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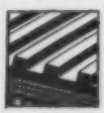
No other V-Belt has ALL these advantages



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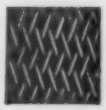

2. Flex-Weave Cover (U.S. Pat. 2519590) A Gates exclusive: provides greater flexibility with far less stress on fabric. Cover wears longer . . . increases belt life . . . more power available to driven machine.

3. Concave sidewalls (U.S. Pat. 1813698) Concave sides (Fig. 1) increase belt life. As belt bends, concave sidewalls become straight, making uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . far longer belt life.

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▶ ▶ ▶ Among the Drilling Contractors

Texas' Duval County keeps 30 rotary drilling rigs busy

MORE THAN 30 rotary rigs still are running in Southwest Texas' Duval County in what has been one of the state's most sustained county-wide concentrations of drilling activity. Although the number of rigs in any area naturally varies from week to week, in Duval County it has held fairly steady around that figure for more than a year.

On a late report, 22 different companies, most of them contractors, had rigs running in this county. Many of those, however, who work as contractors, are engaged in operations of their own.

General Well Drilling Co. and W M & W Well Service Co. currently head the list with three rigs each. All of the former's rigs now are in the Loma Novia area, where they have been drilling for Delhi - Taylor Oil Corp. and Duval Oil Co.

Others currently include Bill Steitle Drilling Co., Killam & Hurd, Rhodes & Hicks, Doran Drilling Co., Chiles Drilling Co., J. W. Gorman, Harkins & Co., H & J Drilling Co., S. H. Howell, Pearl Drilling Co., J. P. Bristow & Co., Bryan & Sibley, W. H. Martin, Price Drilling & Exploration Co., Armstrong & Horn, Long Brothers, Flournoy Drilling Co., Crews Drilling Co., Dillon Drilling Co., and Humble Oil & Refining Co. (own operations).

Most of the drilling is relatively shallow with prevailing productive horizons at depths above 3,500 ft. However, some deep-drilling rigs are needed with some exploration being carried to lower sands as deep as 10,000 to 12,000 ft.

Who's getting the drilling contracts

Circle Drilling Co., Lake Charles, La., will drill Lamar Hunt's projected 13,500-ft. exploratory test in the northwest corner of Lafourche Parish, in southeastern Louisiana. Location, at 1 Caldwell, in 116-14s-15e, is 3 miles northwest of St. John field, nearest production.

Southland Drilling Co., San Antonio, is drilling on another Katz Oil Co. contract in the Kingsville area of northwestern Kleberg County, in Texas' lower coastal region. It is a 9,000-ft. test about a mile southeast of town, and about 2½ miles north of North Ricardo field, where Katz has been active. Southland now is completing a deeper-pay discovery well drilled for Katz in the old Kingsville field, 11 miles southeast of town.

Ace Drilling Co., Dallas, is getting started on a new contract job in northern Houston County, East Texas. It is a 6,500-ft. Woodbine test for T. D. Humphrey, Jr., also of Dallas, at a wildcat location 2 miles northeast of Grapeland. Location, at 1 Goodbread, in the Byrd F. Kerr Survey, is about 2 miles from production at Grapeland.

Sooner Well Service Co., Corpus Christi, is on a new drilling job in the Midway-Holst area, 6 miles south of Taft, in San Patricio County, South Texas. It is a projected 6,800-ft. test for Engeo Oil & Gas Co., also of Corpus Christi. Its location is southeast of old production in the area on the E. S. Holst Estate lease. Burdette Graham and Cosden Petroleum Corp. are joint operators with Engeo in the project.

William H. Martin Drilling Co., Corpus Christi, is well down on a 6,300-ft. test it has been drilling for William J. Carey and Orion Oil Co. in southeastern Duval County, South Texas. Its operation, 2-C Atlee Parr, in the San Andres grant, is 5 miles south of Benavides. It is about a mile southeast of a gas-condensate discovery well drilled by Oil Corp. in 1957, and designated as Crutchfield (5,800-ft. Pettus sand) field.

Grace Drilling Co. is on a new distant wildcat operation in far-western Kansas as contractor for Whitehall Oil Co., of Dallas. The location in northeastern Greeley County is 10 miles northeast of Tribune, and 12 miles west of Carwood pool, in Wichita County, nearest production. Plans call for a 5,300-ft. test.

Noble Drilling Co., Tulsa, has a rig on a remote wildcat location in the northeastern corner of Montana, just a mile from the Canadian border and 7 miles from the North Dakota line. The rig is contracted for a

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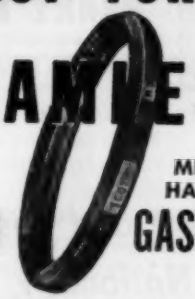

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10,500-ft. Ordovician-Red River test (1 Hanson) for Sun Oil Co. The location is in Sheridan County. It is 30 miles northeast of Outlook field, on the west side of that county.

Loffland Bros. Co., Tulsa, has been awarded the contract on another deep test Shell Oil Co. is starting in the Pelican Lake area, on the west side of Lake Mechant, in the coastal marshes of southwestern Terrebonne Parish, Louisiana. It is a 15,000-ft. job about a mile from another deep test Shell is putting down. The area is about 6 miles southwest of Lake Decade field, nearest production.

Paul F. Rutledge, Santa Fe, N. M., is getting started as the contractor on a wildcat drilling job in Rio Arriba County, northwestern New Mexico. Operator is Felix Hickman, of Albuquerque. Location, 1 Jicarilla, in 28-24n-4w, is 25 miles east of production in the expansive San Juan gas area.

Deckard Drilling Co., Shreveport, will drill a 10,800-ft. Tuscaloosa test at a wildcat location 8½ miles west of Brookhaven, in Lincoln County, South Mississippi. It is a contract job for James W. Proctor and associates, of Jackson, Miss. Location, at 1 Board of Supervisors, in 16-7n-6e, is about 4 miles west of production at Brookhaven.

Marshall R. Young, Brookhaven, Miss., has a contract with Gulf Oil Corp. covering the drilling of a 13,-800-ft. wildcat 3 miles south of Monticello, in Lawrence County, South Mississippi. Gulf's location is on its Robinwood lease in 8-6n-11e. Its objective is the Lower Cretaceous-Paluxy formation.

Sun Drilling Co., Los Angeles, has a rig under contract to Humble Oil & Refining Co. for a deep exploratory test at South San Gabriel, in the Los Angeles area. Its location is on a 4½-acre drilling island from which four additional directional wells can be drilled. Plans are made for a 12,-000-ft. test. Location is near the San Bernardino Freeway.

Justiss-Mears Drilling Co., Jena, La., has contracted for another well Shell Oil Co. is scheduling for its recently discovered Westwood field, in northern Tensas Parish, northeastern Louisiana. It will be Shell's third well. Its discovery well, also drilled by Justiss-Mears, was completed last September with oil production from a 7,350-ft. Lower Tuscaloosa sand. Contracts call for 7,600-ft. drilling.

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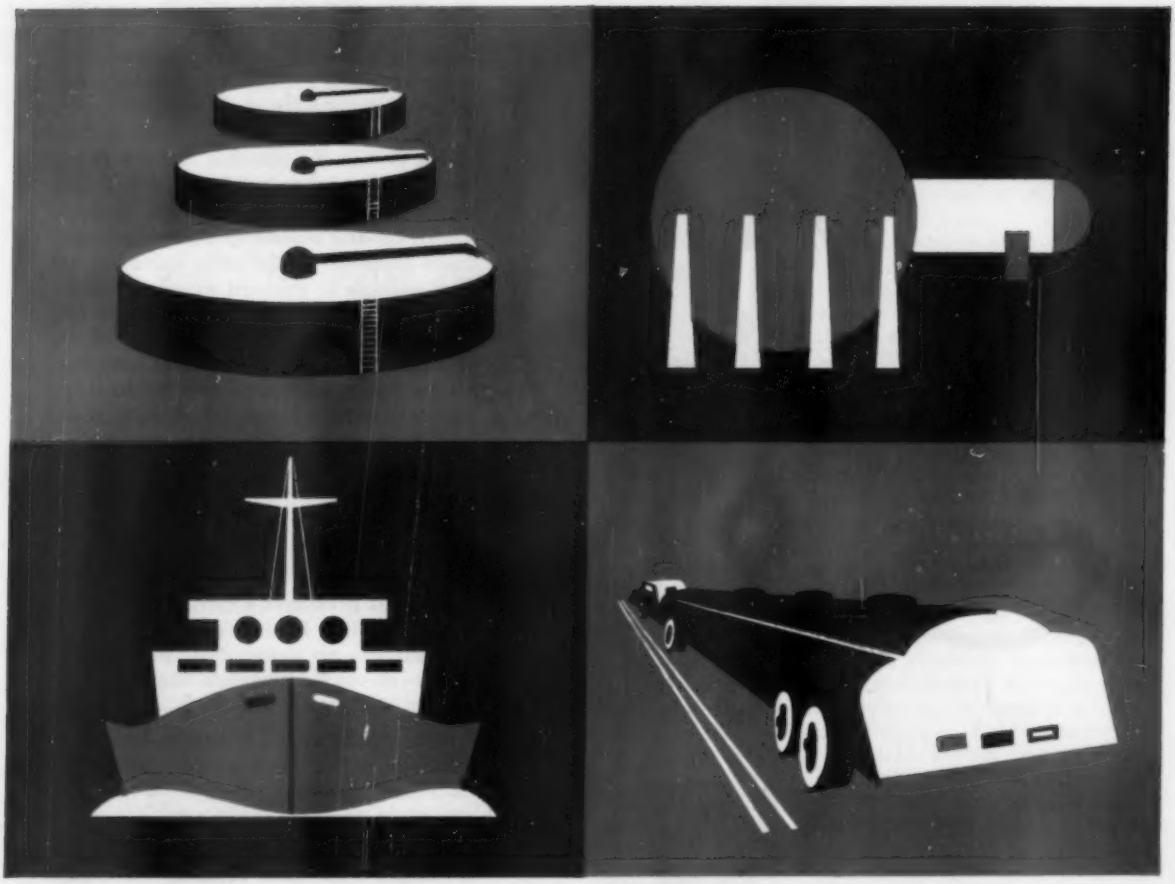

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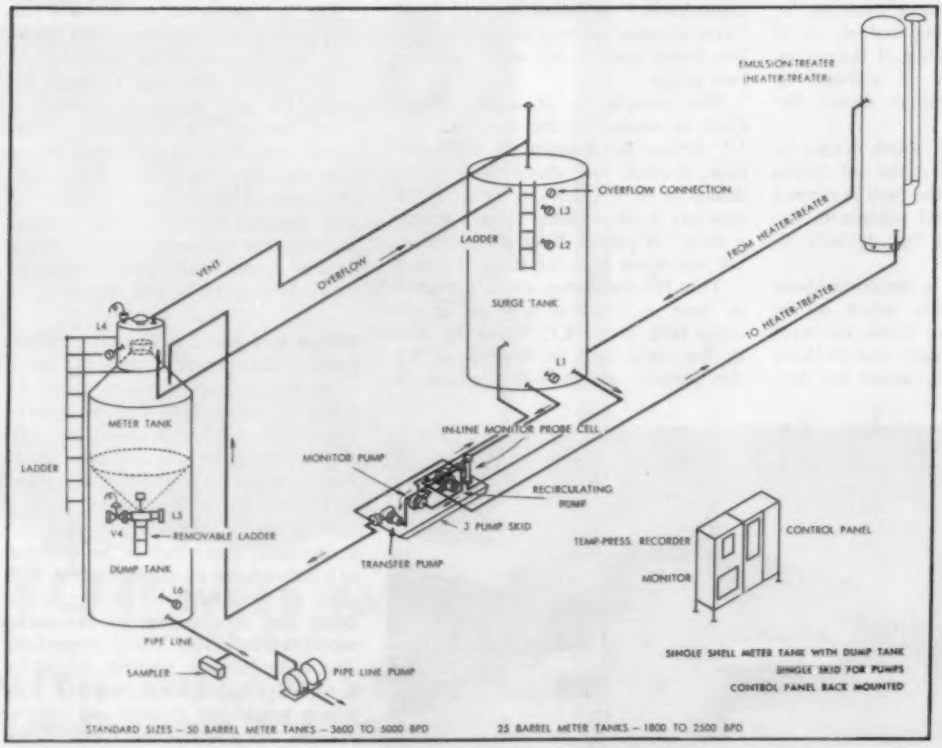


POSITIVE meter-tank-system schematic does not show hookup piping, fittings, or valving. Piping is indicated for simplicity.

Package LACT unit

– – mobile, dependable, accurate

BY M. H. JACKSON
Manager, Custody Transfer Division
Murdock Tank & Manufacturing Co.
and
GENE KINNEY
Assistant Pipeline Editor

THE UNIT measured several hundred thousand barrels of oil over a period of several months as a demonstration unit for Murdock Tank & Manufacturing Co., Tulsa.

Recently it was trucked from the Tulsa plant of the designer and builder to a lease in West Texas. The unit was shipped complete, and was installed under Murdock supervision within a few days at a saving of time and field labor.

The complete 50-bbl. meter-tank-type unit arrived on one truck. The single-shell meter and dump tank was swung into place on a prepared foundation. The transfer, monitor, and recirculating pumps were mounted on a skid complete with monitor probe and internal valving and piping, thus eliminating the need for a foundation.

The control cabinet is weatherproof and dusttight with fused circuits. Lights aid in trouble-shooting identification if circuits afe shorted. A graphic panel with lights indicates the stage of the transfer cycle. The unit is self-operating with all components fail-safe.

The temperature-pressure recorder is a 31-day strip chart. The monitor has an indicating meter, fair-safe feature, temperature compensation including component and cabinet compensation, built-in time delay and accessible entry to internal parts. The instruments are in a common cabinet with front and back doors for easy access.

Operating procedure . . . Here's how the system operates:

It starts when produced oil flows through the emulsion treater to the surge tank and wets level detector L1, which wet starts the b.s. and w. monitor pump. This pump circulates oil from the surge tank through the monitor cell and back into the surge tank. Circulation is continuous so long as oil is above L1. When bad oil is detected, controls prevent delivery to the meter tank, and transfer pump is shut down and the circulating pump starts recirculating bad oil from the surge tank through the emulsion treater. When oil has been cleaned up, the transfer pump is started again. The circulating pump continues to operate for several minutes and then shuts down.

Under normal conditions clean oil flows into the surge tank until it reaches the upper operating level detector L2, which starts the transfer pump. The meter tank fills until oil spills over the center weir in the dome. Construction of the control panel prevents the pipeline dump valve V4 from opening while the transfer pump is operating. No oil can be run to pipeline without being measured.

When oil fills the dome to the level

detector L4, a time delay is actuated to shut down the transfer pump when the oil level in the dome is a few inches above the weir level. Free gas may escape in the surge tank or be taken into a gathering system, or it may leave during filling of the meter tank. Entrained gas is allowed to escape while the oil is above the weir level.

Excess oil in the dome drains to the surge tank. When the oil drains from the weir level, the tank is topped out and the calibrated volume in the meter tank is ready for delivery to pipeline.

Level detector L4 in the dome starts the pipeline-run cycle when oil in the dome has drained below the level detector. Valve V4 opens and oil flows from the meter tank, which has five plastic coats to prevent adherence to the wall, to the dump tank. The pipeline delivery cycle cannot start until the tank has been topped out because L4 is 5 in. below the weir level. Level detector L6 wet starts the pipeline pump and L6 dry stops the pipeline pump.

The completion of each delivery cycle is sensed by the level detector L5, below the bottom of the meter tank, located just above the pipeline dump valve V4. L5 dry actuates the controls to close dump valve V4 after a delay to permit fluid to fall below V4 and again start the transfer pump.

This fill-and-dump cycle continues so long as there is any oil in the surge tank above L1. When the level in the surge tank is lowered to L1, the transfer pump will continue to fill the meter tank. However, when L4 has been actuated, the transfer cycle is interrupted until the surge tank refills to L2.

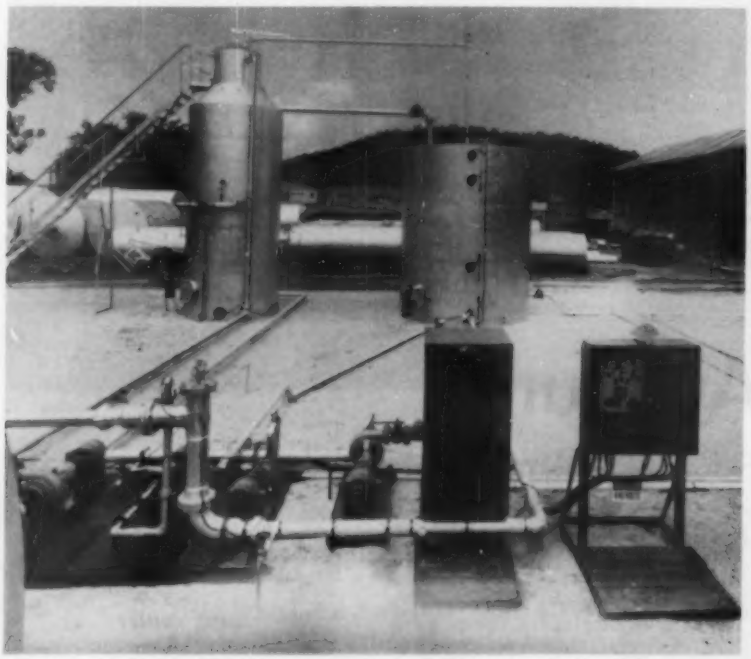
The last measured volume will run to pipeline and delivery will cease until the surge tank is refilled.

For safety shut down, level detector L3 wet stops the operation. Level detector L1 dry or low shuts in the system until wet again by oil from the emulsion treater. The allowable counter permits the delivery of only the volume set on the counter and then the system is shut in. Power failure causes fail-safe closing of valves in shut in of the system.

Design features . . . The only critical point in the operation is that the dump valve must close completely after the dump is completed. This is assured by a limit switch that causes the "O" ring to be under compression before the signal is sent to the transfer pump to fill the meter tank again.

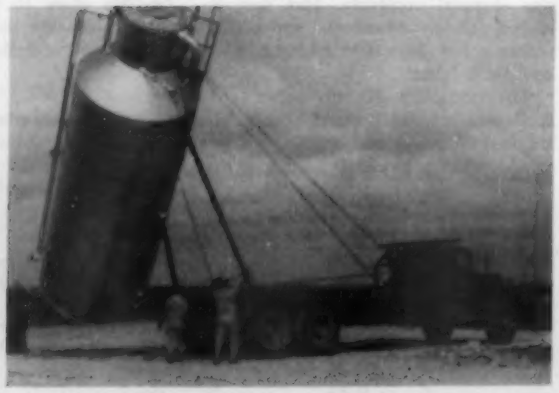
With the overflowing of the weir a necessity, there can be no question of a full-volume measurement. A gage glass in the low point of the drain-down line downstream of the dump motor valve offers visual inspection. The only leakage possible would be a wire-cutting action on the "O" ring which would not involve any volume if there was a leak. Only a short down time would be required to put in a new "O" ring. (So far, in 19 similar units, some in operation for more than a year and a half, there has been no leakage.)

This particular unit with 50-bbl. meter tank is for leases in the range of 3,600 to 5,000 bbl. per day. The system can be designed of course for any size operation, large or small. Murdock is building a 3-bbl. meter tank for a 500-bbl. lease. This small unit, and a new combination emulsion treater and surge section, represent moves toward making LACT economical for smaller leases.



From its plant site, the package-unit . . .

. . . can be loaded onto a truck



. . . and quickly set up in the field

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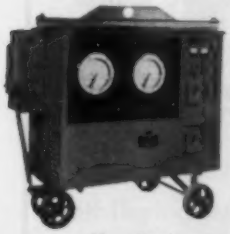

Electronic recording gives permanent charts of heat run on this standard Smith-Dolan model. Coils permit work at 50 feet or more from unit. Eye hooks provide for easy handling by crane. Products ranging from a fraction of an inch to 10 feet in diameter can be heat treated on the job.

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what does

$$\triangle F/A = \triangle p$$

mean to you?

(Continued on next page)

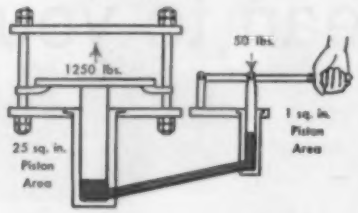
(Continued from preceding page)

$$\triangle F/A = \triangle p$$

. . . is the mathematical expression for Pascal's Principle which states that: "pressure applied to a confined fluid is transmitted uniformly to all areas of the confining fluid."

In the drawing below, notice how a relatively small pressure of 50 pounds applied to the 1 sq. in. piston raised 1,250 pounds on the 25 sq. in. cylinder. Pascal discovered how to multiply the muscles of man a thousand fold! Today, the light touch of a woman's toe against a foot pedal smoothly yet quickly slows and halts a two ton automobile.

Pascal's Principle had been known for hundreds of years when a man by the name of Sven Nordstrom successfully applied the principle to



Here is a demonstration of Pascal's Law. A given pressure of 50 lb lifts 1250 lb over an enlarged area of 50 to 1 ratio

create a most unusual innovation in valves—his invention, the lubricated plug valve. In the most elementary terms, this valve is simply an old fashioned plug cock (used since the days of Pompeii) to which Nordstrom ingeniously applied the Principles of Pascal.

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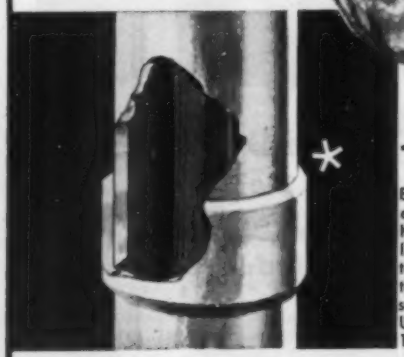

* Both edges of every length of KANEWELD CASING are beveled to assure a weld that is stronger, safer, surer. U. S. Patent No. 1,966,248.

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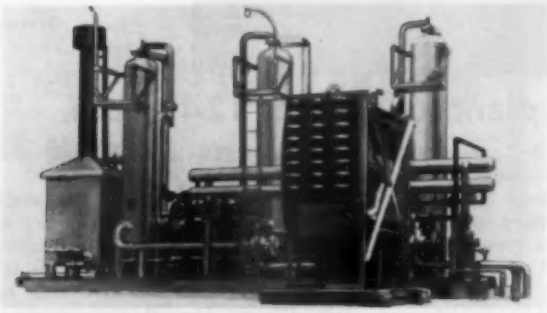
This week's SHOWCASE features . . .



Dehydration-hydrocarbon adsorption

. . . unit promises increased hydrocarbon recovery and lower dew points through the use of three towers. The third tower on the new DAU Type III unit is used to preheat gas before it enters the heating cycle.

The three towers alternately operate on adsorbing, cooling, and heating cycles. Retained heat in the tower on the cooling cycle is used to preheat the gas entering the heating cycle.

In a field test, a unit with two towers was converted to a three-tower unit. Distillate recovery was doubled, the maker reports.

Gas flow rate was 5 M.M.c.f.d. at 600 psi. and 95° F. inlet temperature. The two-tower unit operating on a 35-minute cycle was recovering 11 bbl. of distillate a day. The three-tower unit operating on a 13-minute cycle recovered 22 bbl. of distillate a day. Dew point of gas was lowered from 0° F. with the two-tower unit to —30° F. with the three-tower unit.

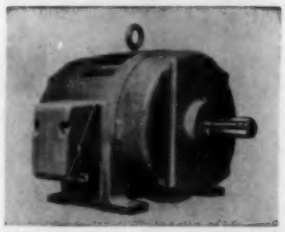
Because of increased recovery capacity, a smaller DAU Type III unit can be used for a given distillate recovery than can a two-tower unit. The smaller towers also require less dessicant replacement during maintenance. **Write or call: Parkersburg Rig & Reel Co., 3327 Winthrop Avenue, Ft. Worth, for details on DAU Type III dehydration-hydrocarbon adsorption unit.**

Suction-line check valve

. . . eliminates need for nipples or unions. And it takes up little installation space. The Model 205-ORU full-flow pump check valve can be installed without cutting pipe on existing installations. Made in a 1½-in. size, the valve has four basic parts.

The body screws directly into the pump casing. The shank attaches to the incoming pipe, and the spacer inserts between the shank and body. The threaded nut holds the unit together in position.

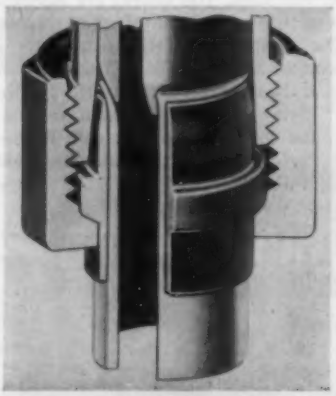
The maker claims the valve can eliminate loss of prime on pumps. **Write or call: Universal Valve Co., Inc., 655 South Street, Elizabeth, N. J., for details on Model 205-ORU check valve for pumps.**



Oil-well pump motor with high slip

. . . and torque is now available in rating of 5 to 60 hp. The KOF motor's performance is closely matched to cyclic oil-well pump loads.

It gives a 400% starting torque



Self-flaring tube fitting

. . . developed which has a hardened-steel sleeve to press the tube into the contoured body to form a flare as the fitting is tightened. The fitting forms a pressure-tight seal on both the inside and outside diameter of the tube.

As the fitting is tightened, the nut comes to a stop and prevents over-tightening. The fitting can be reused a number of times without leaks. It comes in standard tube sizes of ⅛ through 2 in. in such materials as carbon and stainless steel, brass, and aluminum. **Write or call: Flodar Corp., 16911 St. Clair Avenue, Cleveland, Ohio, for details on self-flaring tube fittings.**

Send this Showcase Coupon

to the **Manufacturer** of the item in which you are interested. See name, address, and equipment name and/or model, in bold-face type at end of description.

NAME AND/OR MODEL NUMBER.....

.....

Described in OIL AND GAS JOURNAL - Issue of Dec. 1, 1958

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

and from 8 to 10% slip. The high-starting torque allows the use of a relatively small motor on pumps with a high-starting load. The high slip allows less motor derating for duty cycles than is usually required for an oil-well pump motor as the motor "backs off" from peak loads and uses the inertia of the counterweight to smooth load and current peaks on the power system.

Other features include use of Class B insulation for protection and high heat capacity, double-end ventilation for proper motor cooling and equal cooling of both bearings, and cast-iron construction with all openings screened. **Write or call: General Electric Co., Schenectady 5, N. Y., for details on KOF oil-well pump motor.**

•

Hydraulic-powered pipe squeezer

. . . can be valuable for shutting off service to buildings threatened by fire when the valves are inaccessible. It can also prove useful in relocating service lines, repair of leaky or ruptured lines, speeding of trenching, and for permanently closing service lines for buildings to be moved or demolished.

Useful for hot or cold pipe pinching, the tool has a locknut that gives positive mechanical locking, even with temperature fluctuation over extended periods, the maker says. It is easy to carry and operate in confined areas at temperatures from —65° to 160° F.

Two models are available. Model 5024-S has a 40-ton capacity and is for use with cold steel pipe in sizes to 2½ in. Model 5045-R has a 15-ton capacity and is for use with heated steel pipe in sizes to 2 in. **Write or call: Regent Jack Mfg. Co., 11905 Regentview Avenue, Downey, Calif., for details on hydraulic pipe squeezer.**

Four-place plane cruises at 124 m.p.h.

. . . and is powered by a 6-cylinder, 145-hp. engine. Outstanding features of the new Cessna Model 172 craft include a new instrument panel with the flight instruments grouped in the shock-mounted panel directly in front of the pilot. Engine and systems instruments are located to the right and front of the copilot. They are arranged for fast identification and cross reference.

Rate of climb of the all-metal craft is 660 ft. a minute. Service ceiling is 13,300 ft. Cruising range is 519 miles. Empty weight of the plane is 1,260 lb. Gross weight is 2,200 lb. **Write or call: Cessna Aircraft Co., Wichita, Kan., for details on Model 172.**

Portable strip-chart planimeter

. . . permits integrating the records produced on 4-in. F&P recorders. Either linear or square totalization is available by changing a characterized cam. Operation is easy.

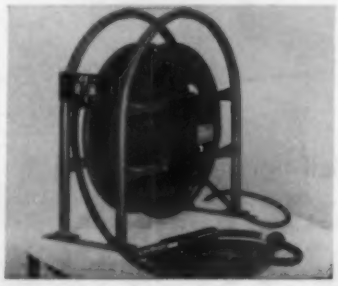
The chart travels through the planimeter at speeds from 0 to 12 chart-hours a minute. Speed is set by a pressure-controlled rheostat. A manually operated knob is used to position the pointer over the chart-record line.

The chart record is totalized in numbers on a five-digit reset counter. At full scale, 100 counts are accumulated for each hour of chart record. The Model 52PA1010 planimeter is accurate to ±1% of full scale count in a 24-hour period. It will totalize a 30-day chart roll without resetting of the counter. **Write or call: Fischer & Porter Co., 808 Jacksonville Road, Hatboro, Pa., for details on Model 52PA1010 planimeter.**

Self-retracting welding-cable reel

. . . holds 50 ft. of 2/0 cable and has a current capacity of 300 amp. with a 60% overload factor. Designated Weldreel Model EA2, the reel is equipped with a strong retracting spring. To rewind cable, just release the locking pawls with a slight tug on the cable and let the spring wind up the cable.

The reel mounts easily on the wall, floor, ceiling or mobile equipment. The reel can greatly extend the life of welding cable. Cable is easily changed when necessary. Four graphite brushes maintain full load contact



with the copper armature. The reel measures 23 in. long, 12 in. wide, and 22½ in. high. Without cable, it weighs 64 lb. **Write or call: United Specialties, Inc., Box 698, El Dorado,**

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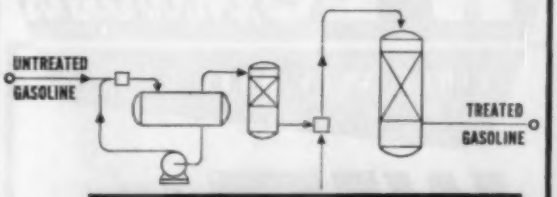

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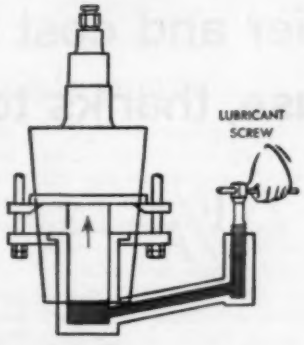
The perfect application of a principle



The lubricant system in the Rockwell-Nordstrom valve is a closed hydraulic system acting much like the two pistons shown on the facing page. Instead of having a separate piston to "charge" lubricant into the valve, the screwed lubricant fitting at the top of the plug acts as the first piston. When lubricant is forced through the fitting by a pressure gun or if the lubricant screw is manually turned down, hydraulic force is magnified and forces lubricant through the channels in the plug.

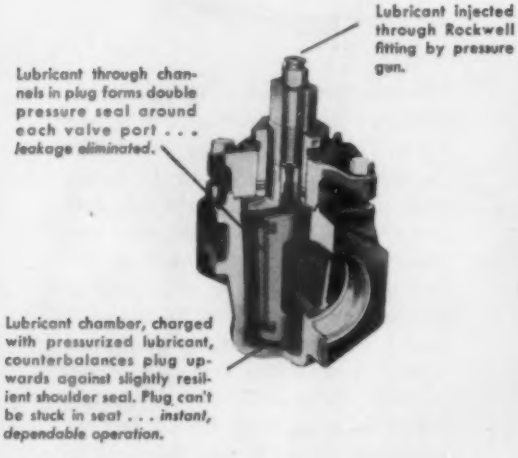
The plug then acts in much the same fashion as the second piston. A shot of lubricant from a pressure gun or a few turns of the lubricant fitting minutely unseats the plug upwards against the resilient shoulder seal, freeing the plug for smooth, easy turning.

(Continued on next page)

(Continued from preceding page)

Here's why Rockwell-Nordstrom valves work better, easier and cost less to use, thanks to

$$\triangle F/A = \triangle p$$


Lubricant injected through Rockwell fitting by pressure gun.
Lubricant through channels in plug forms double pressure seal around each valve port . . . leakage eliminated.
Lubricant chamber, charged with pressurized lubricant, counterbalances plug upwards against slightly resilient shoulder seal. Plug can't be stuck in seat . . . instant, dependable operation.

The drawing above shows how lubricant in Rockwell-Nordstrom valves assures the bottle tight shut-off, smooth, easy operation and unmatched dependability that users have learned to expect over the past forty years. Rockwell-Nordstrom, the *original* lubricated plug valve, is also the world's most complete line. They cost no more to buy, often less, than ordinary valves. Whatever your valve needs, there is a Rockwell-Nordstrom valve that will do the job better, longer and at lower cost. If you'd like to know more about these valves or if you'd like to talk with a Rockwell field sales engineer, write Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.

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Ark., for details on Model EA2 welding cable reel.

●

Underwater headset for offshore

. . . use in drilling and exploration is noncorrosive and completely sealed. It is expected to be valuable for underwater operation in either salt or fresh water to depths of 100 ft.

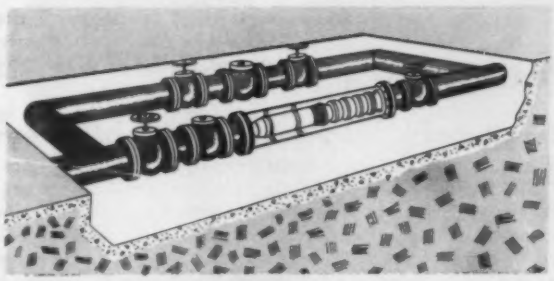
The maker reports it will withstand a wide temperature range and is highly resistant to shock. It can be had with magnetic shielding. The headset was originally built to U. S. Navy specifications and has now been declassified. **Write or call: Telex, Inc., 1633 Eustis Street, St. Paul 1, for details on underwater headset.**

●

Top-mounted liquid-level control

. . . regulates pumps and solenoid or motor-operated valves in tanks, sumps, or vessels. Four models are available. Models A-102-F and A-103-F are for flange mounting. Models A-102 and A-103 are for screw mounting.

The controls are particularly suited for pump control to either fill or empty tank. Specific gravity ranges begin at 0.5 and depend upon the type of displacers used and the operating liquid temperature. Displacers can be glazed porcelain or chemically inert impregnated carbon. **Write or call: Magnetrol, Inc., 2110 South Marshall Boulevard, Chicago 23, for details on Models A-102 and A-103 level controls.**



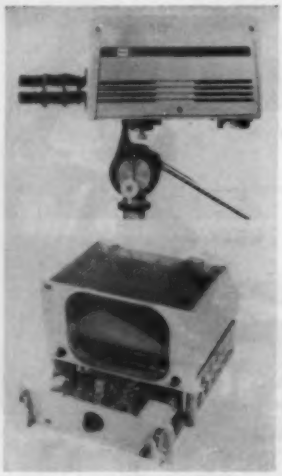
Horizontal, submersible pump

. . . built for pipeline booster service. The new pump is designed to operate in a horizontal position within the pipeline. The Power-Line pump can be suspended within a special section of the pipeline.

The section is flanged at each end and becomes an integral part of the pipeline. The motor is centered and firmly held by spiders within the section. Line fluid is drawn past the motor and into a bowl assembly. It is then passed along at increased pressure.

The submersible power cable leads to a terminal box on the outside of the special section. From there, it goes to a control box.

Also it operates quietly. And the pump motor is not subject to damage from heat, dust, moisture, or vandalism. Available sizes range from 8 to 24 in. Capacities available range from 100 to 4,000 g.p.m. at heads from 50 to 500 ft. **Write or call: Layne & Bowler Pump Co., P. O. Box 6991, Los Angeles, for details on Power Line pipeline pump.**



Closed-circuit TV adjusts itself

. . . automatically to changing light conditions. The automatic light-adjustment control is built-in and standard equipment on the Model 1986 closed-circuit TV system.

The system adjusts instantly to light-level variations of up to 1,000:1. It is particularly suited for use where lighting conditions change rapidly.

The change gives 600-line resolution. Signal-to-noise ratio is greater than 25 decibels. The monitor used has a 14-in. aluminized picture tube. The camera control is blower-cooled and can operate continuously in 55° C. ambient temperature. **Write or call: Kin Tel Div., Cohu Electronics, Inc., Box 623, San Diego 12, for details on Model 1986 TV system.**

Gas chromatograph offers flexibility

. . . through several optional features for solving analysis problems. One optional feature for this new Model 1A Chromat-O-Flex chromatograph is a dual column - switching, automatic-backflush system. It allows rapid analysis of mixtures that have residual components present.

This arrangement backflushes one column while a second freshly flushed column is being used for an analysis. Using this feature, several instruments can be connected in series for staged analysis of complex mixtures.

Optional accessories include a reproducible-volume gas-sample valve; an electronic, proportional, automatic temperature control; and a regulated power supply. **Write or call: Loe Engineering Co., 237 North Fair Oaks, Pasadena, Calif., for Brochure COF-2.**

SHOWCASE . . .

New Literature

Hot spray process theory

. . . is described in a new, revised 28-page booklet. The booklet also features case history stories and photos of the results obtained with hot spray in various plants and in maintenance. It contains pictures and information on spray equipment including the HydraAirless unit, which involves spraying without atomizing air. A question-and-answer section provides technical material on the advantages and possibilities of hot spray. **Write or call: Spec-Flo Co., 6614 Harrisburg Boulevard, Houston 11, for Why Hot Spray? booklet.**

Longer life from V-belt drives

. . . is the topic of a new 16-page illustrated manual now available. It tells how to select and install V-belts, how to detect V-belt trouble, diagnose belt failures, and correct drive troubles. A list of tips for proper V-belt maintenance is included along with a suggested inventory survey check list for V-belt drives. The manual also provides three case histories dealing with money saved by selecting the correct V-belts. **Write or call: B. F. Goodrich Industrial Products Co., Akron, Ohio, for How to Get Longer Life from V-Belt Drives manual.**

Computer programs "library"

. . . designed specifically for small refineries in the use of the IBM 650 computer for engineering purposes is now available. The library, known as the "IBM Proven Engineering Programs for Petroleum Refineries," consists of 10 programs. The package was a cooperative venture by IBM and several oil companies. Each made contributions of tested programs currently being used in various refineries. Most of the programs were actually developed by refinery engineers. All 10 programs would take a highly trained technician nearly 5 years to evolve, according to IBM. Thus, the library will enable the new 650 computer users to reap the benefits of electronic computing almost immediately after installation of the system. **Write or call: International Business Machines Corp., Petroleum Dept. (NR), 590 Madison Avenue, New York 22, N. Y., for Proven Engineering Programs for Petroleum Refineries brochure.**

Single-stage centrifugal compressors

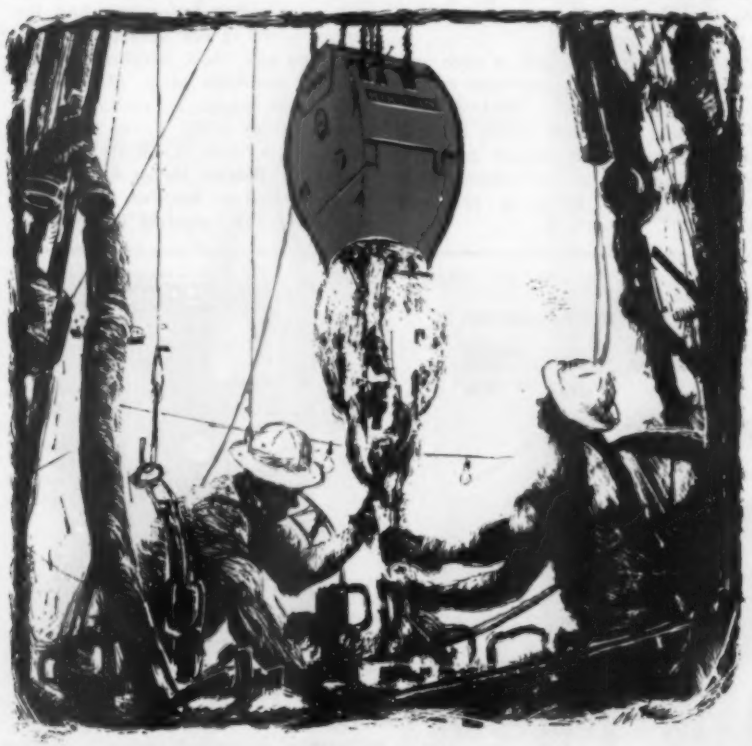
. . . for petrochemical and refinery uses are outlined in new four-page Bulletin 165. Two types of compressors are described in the bulletin: (1) the Series OM for low-pressure air service and (2) the Series OPB for gas applications plus high-pressure air. Capacities range from 1,200 to 80,000 c.f.m., and input horsepower vary between 10 and 2,500 b.hp. The bulletin gives complete details on casings, bearings, seals, impellers, lubrication system, baseplates, and couplings, plus recommended applications. **Write or call: Clark Bros. Co., Box 560, Olean, N. Y., for Bulletin 165.**

Basic swivel-joint types

. . . and styles are reviewed in new 24-page Catalog P-8. The standard designs are accompanied by specifications, size charts, and dimensions. Featured is the 15,000-lb. test Longsweep joint for cementing. **Write or call: Chiksan Co., 330 Pomona Avenue, Brea, Calif., for Catalog P-8.**

Hydrodynamic tubing swab

. . . which has a simple, two-piece steel body designed to accommodate a pair of either of two types of swab rubbers—cup or multidisk—is described in a new four-page bulletin. Any tub-



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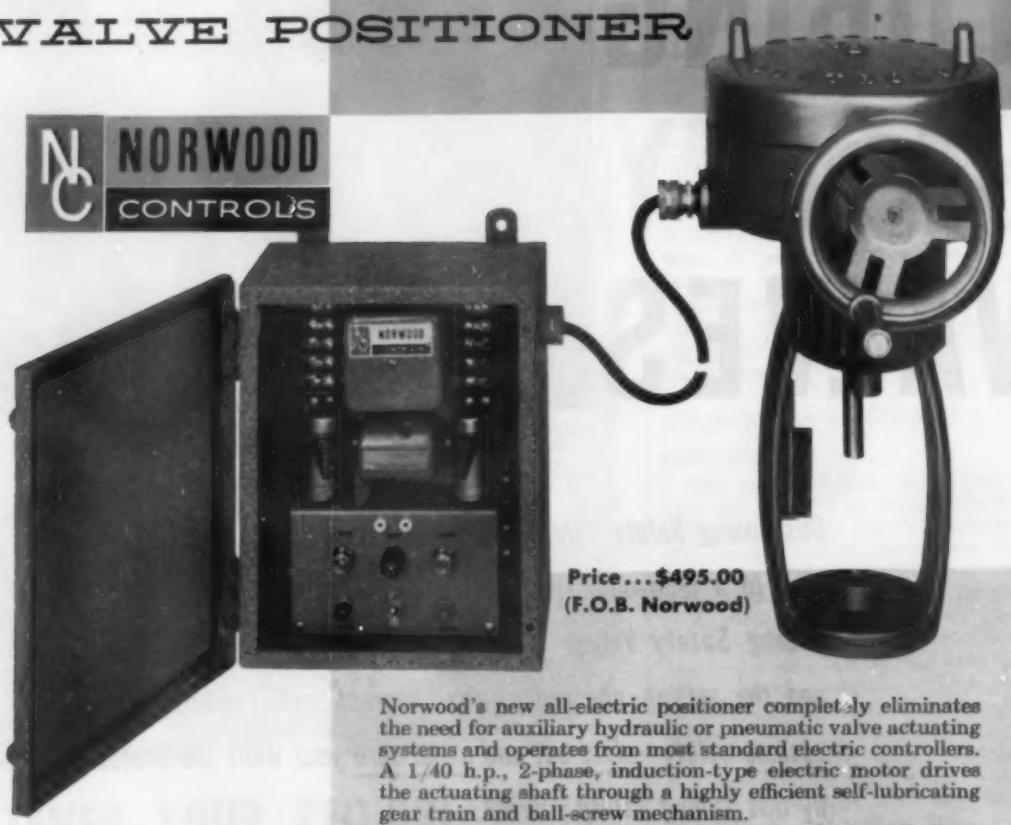
all ELECTRIC

VALVE POSITIONER

NORWOOD CONTROLS



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- EXPLOSION-PROOF
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- MANUALLY OPERABLE
- LOW STAND-BY POWER
- UNIQUE BRAKING . . . prevents valve oscillation

Norwood's new all-electric positioner completely eliminates the need for auxiliary hydraulic or pneumatic valve actuating systems and operates from most standard electric controllers. A 1/40 h.p., 2-phase, induction-type electric motor drives the actuating shaft through a highly efficient self-lubricating gear train and ball-screw mechanism.

Stroke can easily be field-adjusted from ½" to 2". Shaft speed is .15 in./sec. Maximum thrust is 1000 lbs. and built-in limit switches prevent valve damage.

Shaft oscillation is effectively prevented by means of a unique, electro-mechanical braking system which prevents movement of the shaft unless the motor is energized or unless it is being operated manually. The combination of an anticipatory circuit with dynamic braking narrows the dead band and ensures repeatability of position to within ¼%. Stand-by power requirement is as low as 50 watts.

For further information, write for data sheet B158-5.

Norwood Controls Unit, Detroit Controls Division,
942 Washington St., Norwood, Mass.

AMERICAN-Standard PRODUCTS

AMERICAN-Standard
DETROIT CONTROLS DIVISION

ing-swab operation can be performed with the one body and two types of rubbers, according to the bulletin. The efficient swab falls faster because of annular clearance going down, and adjusts itself to any size load on the way up. Included in the bulletin are color photos and diagrams showing the swab's use, along with complete specifications for tubing swabs and components. **Write or call: Byron Jackson Tools, Inc., P. O. Box 2017-A, Terminal Annex, Los Angeles 54, for Hydrodynamic Tubing Swab Bulletin.**

Designing in 3-D, a catalog

. . . shows how to assemble industrial scale models and describes parts and materials needed. This "do-it-yourself" approach to model-making is expected to aid and speed design and sales-engineering problems. Three-dimensional "drafting" becomes a universal, convenient, and economical engineering tool by applying this new technique, according to the maker. **Write or call: Scott Industries, Inc., Olean, N. Y., for Designing in 3-D Catalog.**

Valve-regulator maintenance manual

. . . which includes typical installations, along with piping and mounting arrangements is now available in a 16-page form. The photo-illustrated manual also includes special sections which discuss the following topics: (1) typical operational troubles; (2) how to check troubles; (3) orifice and nozzle cleaning; (4) how the positioner and controller work; and (5) adjustments. **Write or call: Rockwell Mfg. Co., Meter & Valve Div., 400 North Lexington Avenue, Pittsburgh 8, for Bulletin 1099.**

High-capacity Flowrator meter

. . . suitable for measuring flow rates as high as 4,360 g.p.m. is described in new Specification Bulletin 10A1156. The bulletin offers a pressure-temperature curve showing operational limits, along with a capacity table and a dimensional chart of the meter. **Write or call: Fischer & Porter Co., 819 Jacksonville Road, Hatboro, Pa., for Specification Bulletin 10A1156.**

Air-jacketed silencers

. . . suppress engine noises while they ventilate engine rooms and surrounding areas, as illustrated in a new four-page brochure. The brochure includes descriptions, dimensions, and applications of nine models. **Write or call: Maxim Silencer Co., 85 Homestead Avenue, Hartford, Conn., for Air-Jacketed Silencers Bulletin.**

Beam-counterbalanced pumping units

. . . with API unit structure ratings of 4,170 and 7,240 lb. are outlined in new eight-page Bulletin 474. The bulletin describes Types E-5 and E-7 pumping units with respective peak torques of 16,000 and 25,000 in.-lb. Detailed construction and operating features are given. **Write or call: National Supply Co., 2 Gateway Center, Pittsburgh 22, for Bulletin 474.**

Through-tubing tools, techniques

. . . offer cash savings as described in a new eight-page bulletin. The tools and methods do away with the need for a rig during the final stages of initial completion as well as for remedial workover jobs throughout the life of the well, according to the bulletin. It explains that all this work, which may include plugbacks, reperforations, logging, etc., is performed with an electric wire line. A question-answer section is also included. **Write or call: Great Lakes Petroleum Services, Inc., P. O. Box 2050, Houston, for Through-Tubing Tools and Techniques Catalog.**

In Worthington QD Sheaves these extra

2 SCREWS MAKE THE DIFFERENCE

Only Worthington QD Sheaves offer the oil industry:

EASY ON two-piece sheave design for simple, rapid installation.

EASY OFF assembly for part-by-part removal.

ALWAYS TIGHT sheave construction for sure, safe positioning.

COMPLETE STOCK and service available anywhere in the oil industry from over 350 distributors.

For 100 page Multi-V Drive Manual on sheave and Worthington-Goodyear Green Seal V-belt selection write to Worthington Corporation, Section 79-11, Harrison, N. J.

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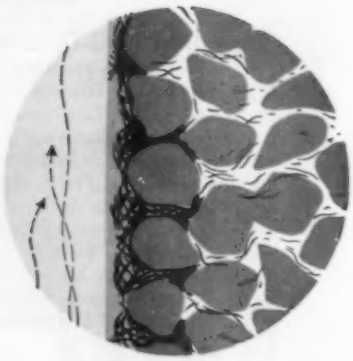
Baroid's **new**

bridging fiber

combats tough cases of lost circulation



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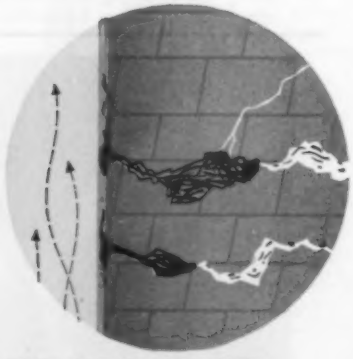
PLUG-GIT ... processed hardwood fibers, controls lost circulation

PLUG-GIT ... quickly builds a strong, tough, matted bridge, stops mud loss

PLUG-GIT ... easy to handle, easy to mix, economical

Specify **PLUG-GIT** and see for yourself why it wins immediate approval of drillers and engineers for combating lost circulation.



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B 5921

Dallas Tank-Trinity Steel merge

. . . and will be known as Trinity Steel Co., Inc., with Dallas Tank Co. custom division handling refinery, chemical plants, gasoline plants, and other plate steel fabrications built to customer's specifications. C. J. Bender, Trinity Steel Co., will serve as chair-

C. J. Bender

W. R. Wallace

man of the board of directors of the merged companies. W. Ray Wallace, president, Trinity Steel, will actively conduct the administrative duties. He will be assisted by Ray L. Reedy, LPG division, and E. O. Haltom, Sr., custom division. The entire production will be moved to the present offices of Trinity Steel in Dallas.

Design service opens plant

. . . in Tulsa to aid exhibitors at the 1959 International Petroleum Exposition. Gardner, Robinson, Stierheim & Weis, Inc., Pittsburgh, Pa., an established designer and builder of trade-show exhibits and displays, has installed a branch plant of over 6,500 sq. ft. near the exposition grounds to take care of on-the-spot fabrication and erection of exhibits, thus eliminating most packing and shipping costs.

Continental-Emsco Co. names

. . . Jack N. Smith as manager of its sales outlet in Corpus Christi, Tex. R. A. Broussard has been appointed store manager at Harvey, La. G. C. McCay will manage the oil-field supply store at Red Deer, Alta. D+B specialist F. D. Church has been assigned to the Hobbs, N. M., area; and R. G. Hamilton will headquarter in Tatum, N. M., as D+B specialist.

Gas turbine operations committee visits Clark Bros. plant

. . . at Olean, N. Y., to inspect manufacturing facilities and discuss gas turbine developments with engineering personnel. Pictured are: J. J. Rosecky, Clark Brothers; R. J. Parks, Aramco; J. E. Fenex, Petroleum Chemicals, Inc.; J. E. Leo, Trans-Arabian Pipeline Co.; C. A. Falkenhagen, Tennessee Gas Transmission Co.; G. H. Ewing, Texas Eastern Transmission Corp; A. H. Carameros, El Paso Natural Gas Co.; F. A. Cramer, Southern Counties Gas Co.; M. M. Heller, United Gas Co.; R. M. Greene and R. J. Spears, Clark Brothers Co.

Eastman Oil Well Survey names

. . . Stephen S. Roszel, Jr., as general sales manager to headquarter in Denver, reports H. John Eastman, presi-

S. S. Roszel, Jr.

H. L. Moschel

dent. H. L. Moschel was elected a vice president and also named manager of the new southern division. He will headquarter in Houston. The southern division was recently formed by the consolidation of the Central division and the Gulf Coast division. Roszel was formerly assistant general sales manager, and Moschel was formerly Central division manager.

These 26 men get first-hand look at completion practices

. . . at Brown Oil Tools, Inc., plant in Houston recently. The visitors from the School of Production Technology in Kilgore, Tex., represent 20 companies that operate all over the world. Students seated are: G. M. Martin, Cabot Carbon Co.; J. J. Larkin III, Larkin Packer Co., Inc.; G. C. Palmer, Southwest Natural Production Co.; G. C. Smith, Magnolia Petroleum Co.; H. N. Berryman, Jr., Arcadia Refining Co.; W. C. Cheatham, Mene Grande Oil Co.; G. E. Talbott, Shell Oil Co.; R. W. Muir, Shell Condor; M. A. Beeson, Socony Mobil de Venezuela; K. R. J. Trott, Kuwait Oil Co., Ltd.; and L. M. Schischkowsky, Shell Oil Co. of Canada, Ltd.

Standing are: B. B. Cotton, Larkin Packer; H. M. Johnson, Tennessee Gas Transmission Co.; Pieter Schoe, Cia. Shell de Venezuela; William Miskimins, Jr., Tennessee Gas Transmission; C. H. Bilbrey, Honolulu Oil Corp.; Pedro Jacinto Anon, Mene Grande Oil; Pablo Alfonso Jimenez, Creole Petroleum Corp.; W. E. Hammon, Jr., Creole Petroleum; Gaston Gaal, Blue Danube Oil Co.; R. J. Nelson, H. W. Bass & Sons, Inc.; R. A. Gordon, Apex (Trinidad) Oilfields, Ltd.; G. D. Bullock, Jersey Production Research Co.; W. M. Hitchcock, Blue Danube Oil; C. O. Turner, Magnolia Petroleum; and R. E. Preston, Caltex Pacific Oil Co.

Girdler Catalysts opens

. . . a New York City field office, according to an announcement by the chemical products division of Chemetron Corp. James V. Weir will head the new office. It will provide technical sales and services to users of Girdler catalysts in 12 northeastern states, including New England, the Middle Atlantic states, Delaware, and Virginia. Before joining Girdler

" . . . supply stores have not faltered in giving good service"

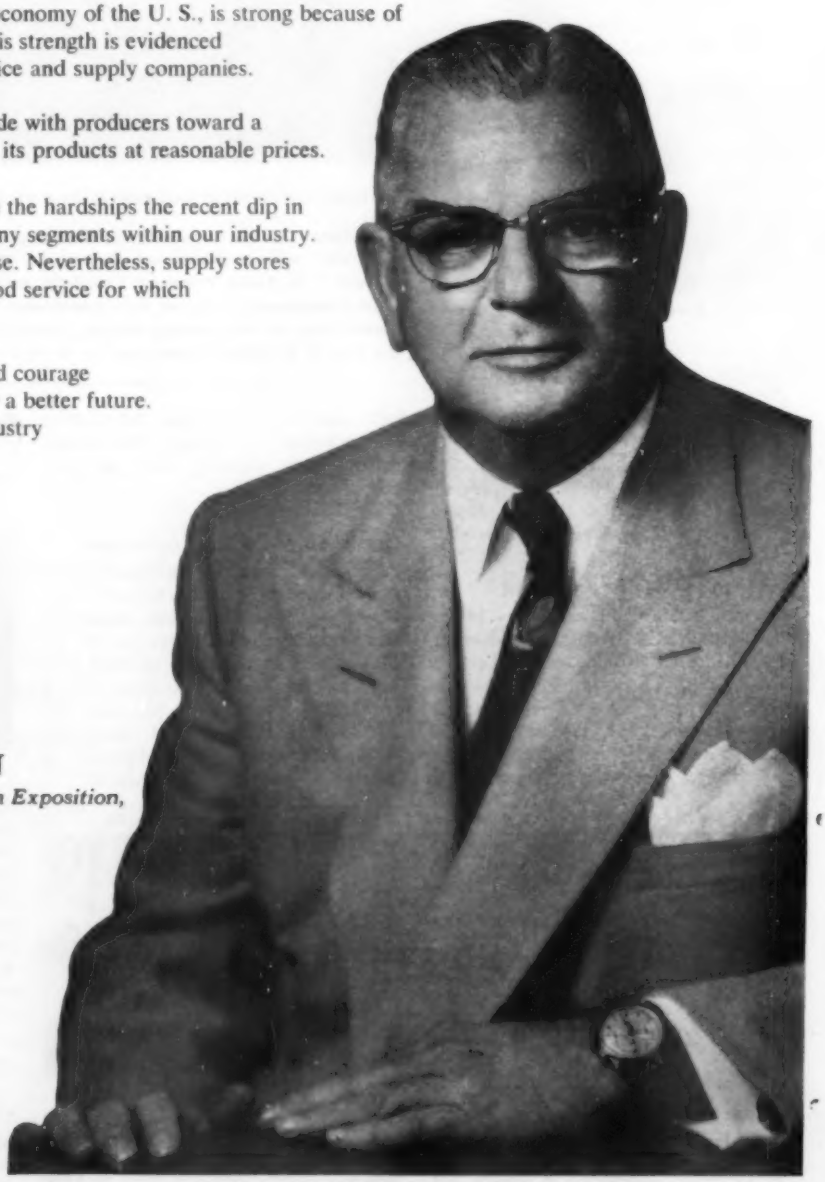
"There are Prophets of Gloom who continuously cry that 'We are running out of oil.' I am not one of them because I am firmly convinced that America will not run out of oil in the foreseeable future—provided our system of private enterprise is allowed to take its natural course.

"The oil industry, like the overall economy of the U. S., is strong because of such a system. One example of this strength is evidenced by the industry's equipment, service and supply companies.

"Those companies strive side by side with producers toward a common goal: Adequate oil and its products at reasonable prices.

"All of us in the industry recognize the hardships the recent dip in the oil activity has worked on many segments within our industry. The supply industry is one of these. Nevertheless, supply stores have not faltered in giving the good service for which they long have been noted.

"This is the type of doggedness and courage that licks problems and builds for a better future. And, certainly, the petroleum industry has a great future."



MR. W. K. WARREN

President, International Petroleum Exposition,
Chairman of the Board and
Chief Executive Officer,
Warren Petroleum Corporation

P.E.S.A.*

* PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION

PROUD TO BE PART OF A PIONEERING INDUSTRY

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION

Weir was manager of administration and services for the research division of Minerals & Chemicals Corp. of America.

Richard I. Barlow joins

... Barton Instrument Corp., Monterey Park, Calif., as manager, sales and application engineering department. Prior to joining Barton, he had 8 years industrial instrumentation experience with Bristol Co., Barber-Coleman Co., and the last 5 years with Panellit, Inc.

Welex, Inc., promotes two men

... to division managers. In charge of the California division in Los Angeles, is H. A. Woodard, former division

H. A. Woodard

F. D. Sawyer

sales manager. New Rocky Mountain division manager at Denver is F. D. Sawyer, formerly assistant sales manager in Fort Worth. Woodard joined Welex's staff in 1957. Sawyer is a veteran of 12 years oil well service work, the last 6 years with Welex.

Willard F. Hall named

W. F. Hall

... assistant sales manager of International Harvester Co.'s construction equipment division, according to H. T. Reishus, divisional vice president. Hall, who had been Central region sales manager of the division, began his IH service at the Minneapolis district office in 1939.

Crane Packing Co. inspected

... by a group of 23 executives and industrialists from Sweden, Denmark, and Finland. The team, traveling under the auspices of the Royal Swedish Academy of Industry and Science, was originated by the Swedish Association of Metal Industry. The purpose of this inspection was to get first-hand knowledge of new trends and developments in management techniques in

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John Zink Waste Disposal Units are custom designed to your specifications, for your individual application. Any size or capacity can be furnished for use in reducing liquid and semi-liquid wastes, or obnoxious gases. Available as a complete unit or burners only. John Zink Waste Disposal Units have been field-proven in process service throughout the world.

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Those interested are invited to write to the
Director of Engineering,
THE THOMPSON-RAMO-WOOLDRIDGE PRODUCTS COMPANY
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the United States. The tour was conducted under the guidance of Karl Rohlen, president, Crane Packing, and B. H. Stenberg, vice president in charge of manufacturing.

J. F. Pritchard & Co. reports

... the formation of Constock-Pritchard Liquefaction Corp. with headquarters in New York. This company is jointly owned by J. F. Pritchard, Continental Oil Co., and The Union Stock Yard & Transit Co. The company is formed to develop the design and construction of plants, appurtenances, and facilities for all phases of gas liquefaction.

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We have the know-how through experience and have Le Roi proven Air Drilling Equipment to meet most requirements—any capacity—pressures up to 1500#—Rental with option of purchase—Sales.

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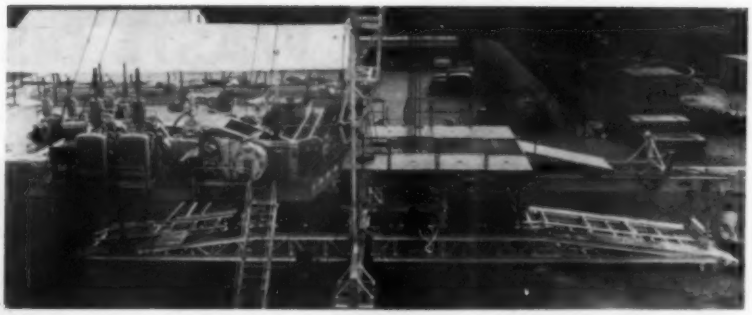

Built by Woodfield Rochester, Ltd. this rig is 2nd

... to be delivered to Drilling & Exploration, Ltd., for operations in the Kirkuk oil field in the Middle East. The equipment was erected under license from Ideco, Inc., Dallas, one of the Dresser Industries. A duplicate of the Ideco Rambler, the rig is mounted on two dual trailer outfits, one for the mast and substructure, and the other for the draw works and power groups. The contractor will use both rigs for Iraq Petroleum Co., Ltd. The two rigs have been delivered complete with all drilling equipment, camp and living accommodations, and transportation by Woodfield Rochester.

Douglas Owen appointed

Douglas Owen

... as executive vice president of Alberta Phoenix Tube & Pipe, Ltd., reports Frank M. McMahon, president. In addition to the duties of this new position, Owen will take over the management of the company, replacing E. W. Gommel, general manager, who has resigned.

The Geotechnical Corp. moves

... into a new 40,000 sq. ft. plant, according to William B. Heroy, president. The plant is located at Garland, Tex., just north of Dallas. The move enables Geotech to strengthen and expand its position in the field of research, design, and manufacture of electromechanical instrumentation.

NOW— Automatic Drainage of High-Pressure Air or Gas Systems—Up to 3500 Psi

- **Eliminates Manual Bleeding**
- **Prevents Loss of Gas**
- **Saves Time, Trouble and Money**

The new Armstrong high-pressure gas trap illustrated *automatically* drains the system without gas loss. This completely reliable trap incorporates the time-tested Armstrong steam trap mechanism, adapted to the service.

Construction is of highest quality—forged steel body and cap, stainless steel working parts, heat-treated chrome steel valve and seat. Open-float bucket cannot collapse.

ASK FOR BULLETIN NO. 401 for complete details . . . lists physical data, prices and ordering information. Get your copy today—call your local Armstrong Factory Representative or write:

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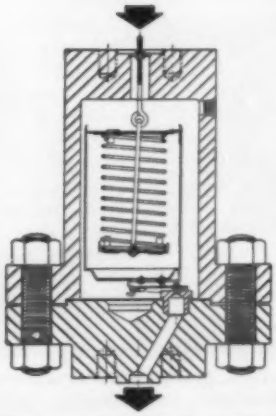
Satisfaction Guaranteed

How It Works

Bucket is first primed with water, the weight of which compresses spring and closes valve. As condensate enters at top, it spills over side of bucket and begins to fill body of trap. When level gets about half-way up bucket, buoyancy of bucket plus spring action overcomes pressure and lifts bucket, opening valve. As condensate discharges, bucket loses buoyancy and sinks, closing valve. Valve *always* closes before all condensate is discharged, thus assuring a perfect water seal at all times.



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Trap No.	2315-S	2415-S	2515-S	2615-S
Max. Pressure	1000 lb	2000 lb	3000 lb	3500 lb
Capacity at Max. Pressure	7000 lb/hr	4200 lb/hr	5000 lb/hr	300 lb/hr
Pipe Connections	½", ¾", 1½"	½", ¾", 1½"	½"–¾"	½"–¾"

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Because every drilling well imposes its own set of reaming conditions, Grant makes *three* distinct Reamer types to meet all formation, depth and drilling requirements... all preferences.

Moreover, when you add five Grant cutter styles... 3, 6 or 9-point Reamer models... and a complete range of sizes—you have an *unlimited combination* of Grant Reamers for efficient, economical reaming in any well, anywhere.

There are Grant Reamers for every reaming job simply because, when it comes to Reamers—**only** *Grant makes them all!*

This is just one of the three *families* of Grant Tools made for reaming, hole enlarging and stabilizing. For full information on these, and a wide range of other down-hole and surface tools made by Grant, send for your copy of the complete Grant Catalog *today!*

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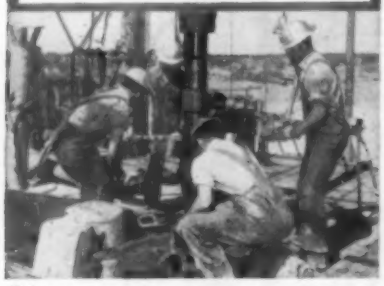
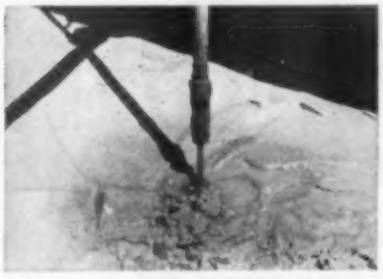
How you can cut drilling costs with DRISCOSE

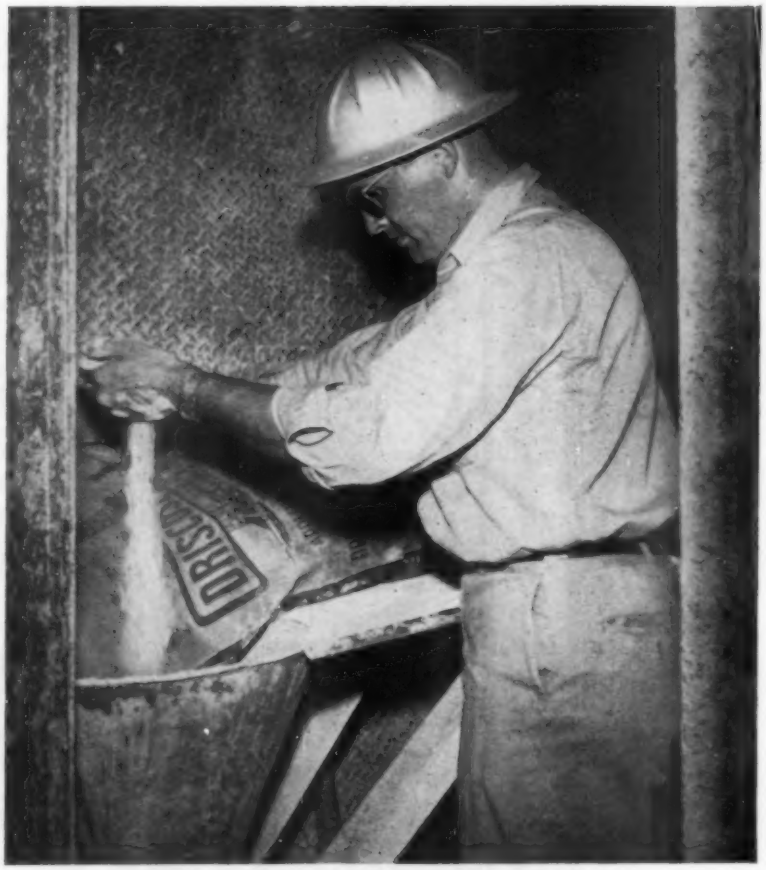


Driscose speeds penetration. Driscose low-solids muds approach the drilling characteristics of water and at the same time provide desired viscosity and wall-building properties.

Driscose mud systems are trouble-free. Driscose muds are more stable and have better flow characteristics.



Driscose simplifies mud control, since low-solids muds require less chemical treatment than conventional systems.



A LITTLE DRISCOSE* GOES A LONG WAY!

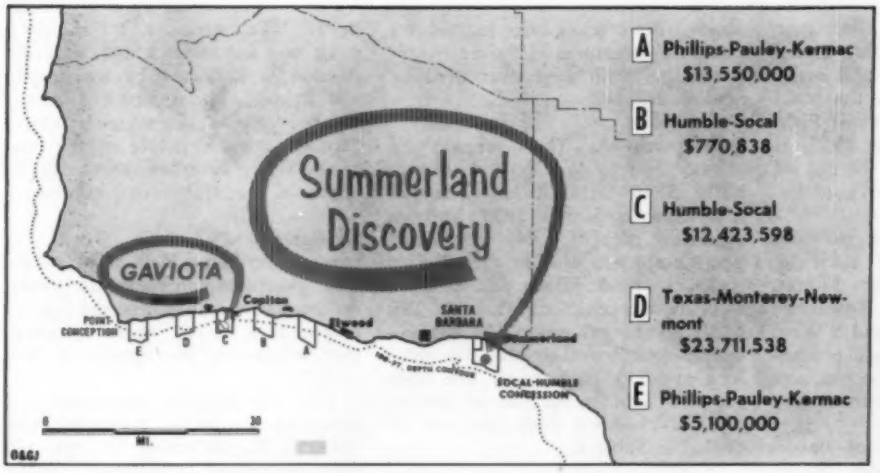
A typical low-solids mud having a viscosity of 16 cps can be made using only ¾ lb. High-Viscosity Driscose, 5 lb. per barrel bentonite and 6 to 8% oil. The use of such a Driscose system allows a reduction in solids of 19.25 lb. per barrel. Drilling Specialties Company has researched and pioneered the basic applications for Driscose since originating the use of CMC in well-drilling operations over 10 years ago.

Driscose is readily available from your regular mud dealer in three grades: High Viscosity (99+% pure CMC), Medium Viscosity (99+% pure CMC) and Technical Grade (72+% CMC). Other specific types can be furnished on request. Insist on Driscose . . . your best insurance for a trouble-free hole!

The Proof is in Performance!

DRILLING SPECIALTIES COMPANY
Bartlesville, Oklahoma

*Driscose is a trademark for Sodium Carboxymethylcellulose.



FIRST major oil strike in California this year, and first for the state in many years, has been made at Summerland. Standard Oil Co. of California and Humble Oil & Refining Co. hit pay dirt at their 1 Summerland-State, an offshore wildcat on a $7.25-million state lease.

Offshore spotlight swings to California

BY FRANK J. GARDNER

THE MOST important California discovery of the past few years has just occurred off the southern shore of that state. A major field is in the making there.

Standard Oil Co. of California, operating a 5,500-acre lease held jointly with Humble Oil & Refining Co., last week announced an initial test flow of 865 bbl. per day at its offshore wildcat, the 1 Summerland-State. Gravity of the oil was 36°, and it came from Oligocene-Sespe sand at total depth 7,328 ft. It is the first well drilled from a permanent platform off California.

An expensive wildcat . . . So far, Standard and Humble have sunk about $12,000,000 into this hole. The lease itself cost $7,250,000. The permanent platform came to $3,000,000. And preliminary core drilling was another $5,000,000. That's pretty expensive wildcatting. But the dice rolled right, and the two companies will get many times their money back. The platform is capable of drilling 25 wells.

Operators are continuing to run tests at the new discovery, which lies 2.2 miles from the Santa Barbara County shore. Details of the test are being withheld temporarily, but there's little doubt that California has entered at last its important offshore era.

For the past 3½ years, many companies have been conducting seismic and core-drilling operations off the southern California coast. What they learned was of course a closely guarded secret, but the truth came out last June when the state called for lease bids on its tidelands. Bids submitted totaled $55,555,974, an all-time record for a single U. S. offshore sale. Bids on the individual parcels are shown on the map; the $23,711,538 bid on Parcel D by The Texas Co., Monterey Oil Co., and Newmont Oil Co. set an all-time offshore record of $6,175 per acre. Standard and Humble had sealed the deal on their acreage 18 months earlier for a cash bonus of $1,318 per acre and 12% royalty to the state.

Will start a chain reaction . . . The Summerland discovery indicates that within the next 2½ years, we can expect to see a chain of major new oil fields sprout from the waters off California. Every economic and legal factor favors the play. If you get a well there, you can expect it to pay out faster than in any other offshore area. Another factor: holders of the parcels lettered on the map must drill a well within 3 years from the date of the lease; if the 3-year limit runs out while the first well is drilling, and the test is dry, the lease is lost.

This exploration campaign is already well along the way. The Standard-Humble combo is approaching bottom at the 1 Gaviota-State (Parcel C on map); here, drilling from a mobile platform, the story will be told within a matter of days. Other wildcats are going down on Parcels A, D, and E.

So for a really spirited and probably successful exploration program, all eyes should now turn to offshore California. In speaking of Summerland not long ago, Standard's house organ, The Oiler, had this to say: "How much do we expect to produce? We don't know. We don't really know if there's any oil there at all. Our geologists see some good signs."

Now they know. And the 20-20 vision of the company's geologists has been confirmed.

At an appropriate time . . . As for Humble, nothing could have been more appropriate right now than this discovery. For it bears out the recent optimistic forecasts of its president, Geologist Morgan Davis, in his speech to the API. You can read the full text of that speech in next week's Journal. In it, Davis predicts the discovery of 70 million barrels of new oil in this country in the next 20 years. Is it coincidence that his own company is joint finder of the first major oil field of 1958?

Illinois Fishhook -- remote basin-edge gas field

A REMOTE SILURIAN limestone gas field is quietly developing in the northwestern part of the Illinois basin, more than 70 miles from the main oil-producing region of Illinois. Fishhook gas pool, opened in 1955, is located near the western border of the state in Pike and Adams counties.

Introduction . . . Fishhook gas pool is 11 miles northwest of Pittsfield, county seat of Pike County, Illinois. Location of the field is in Townships 3 and 4 South, Ranges 4 and 5 West. Far removed from Illinois production, Fishhook opens a vast rim area for exploration in the northwest and west sectors of the basin.

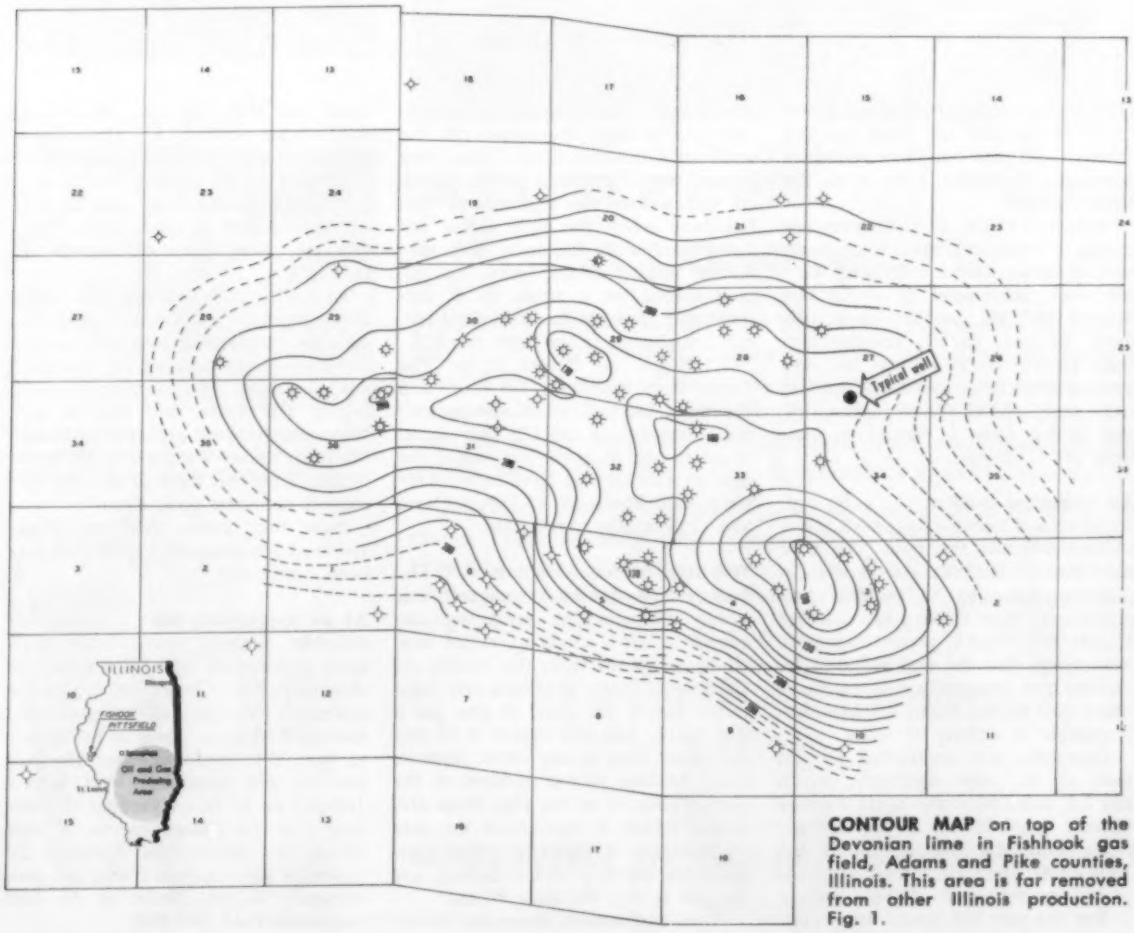
The field is in a part of Illinois where the main pay zones of the state are thin or absent. The producing formation at Fishhook, the Silurian limestone, is the same as that of the old Pittsfield gas pool, discovered in 1886, but no longer producing. Both pools are located on anticlinal structures of similar size and shape. Both were discovered by random drilling.

Development . . . The discovery well of the field is W. Vette 1 Layne, NE¼ SE¼ SE¼ 30-3s-4w. It was completed in March 1955 with an open-flow gage of 1,140 M.c.f.d. of gas. Completion was in the Silurian rocks at 460 ft. Since that time 85 wells have been completed. Of this total, 70 are gas wells. The gas-producing area is oval-shaped, 5½ miles long and 2½ miles wide. The wells are now shut in because of lack of market. Fishhook field data are included in Table 1.

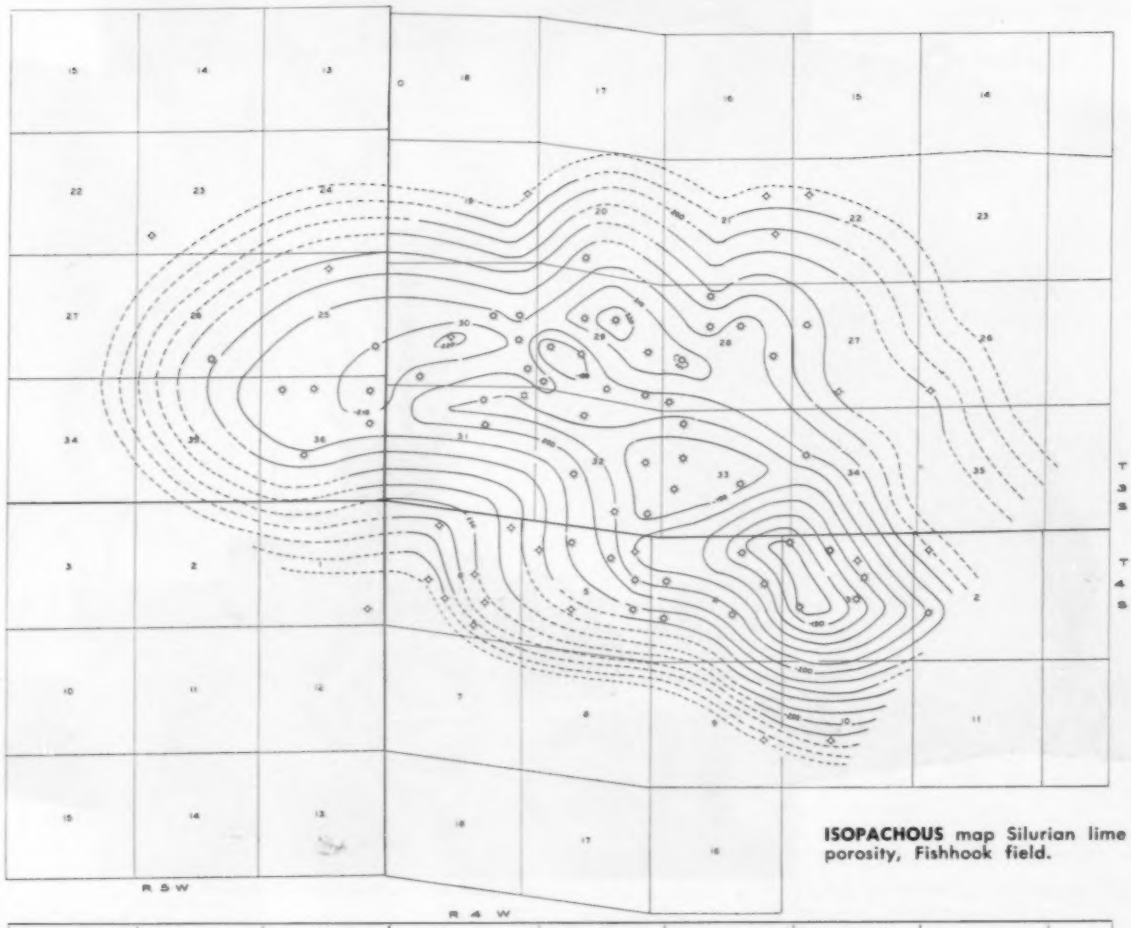
Structure . . . The Fishhook gas structure is an elongate oval anticline that trends slightly south of east and north of west and has a closure of about 100 ft. on top of the Silurian limestone. The structure is about 8 miles long and about 5 miles wide. Its position is indicated by topography and drainage. The structure of the top of the Silurian limestone is nearly parallel to the structure of the base of the Osage limestone about 180 ft. higher in the stratigraphic column.

Stratigraphy . . . Thin glacial drift overlies the bedrock in most of the area. Pennsylvanian rocks are present on the flanks of the structure but are absent over its top where Mississippian strata are the uppermost bedrock.

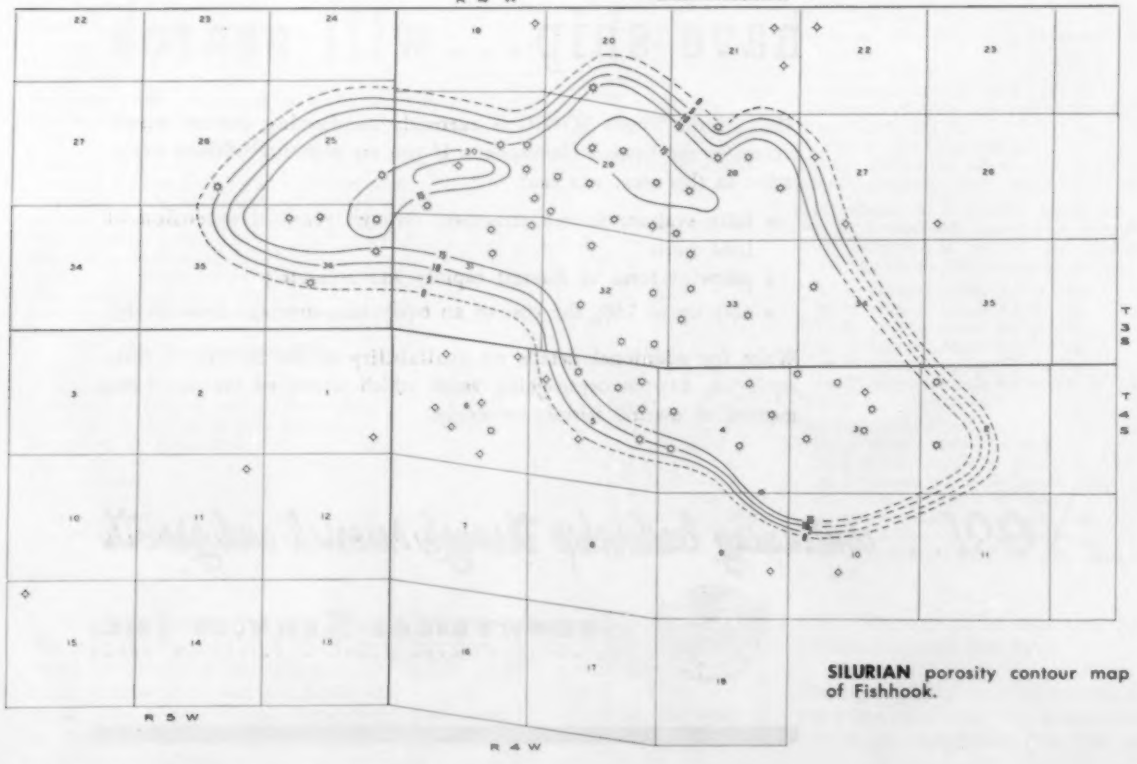
The Mississippian limestones and dolomites range in thickness from 160-250 ft., according to logs, and the underlying Kinderhook shales average 180 ft. thick. Devonian rocks are absent on the upper portion of the Fishhook structure, but there are indications of Devonian type beds in nearby wells.



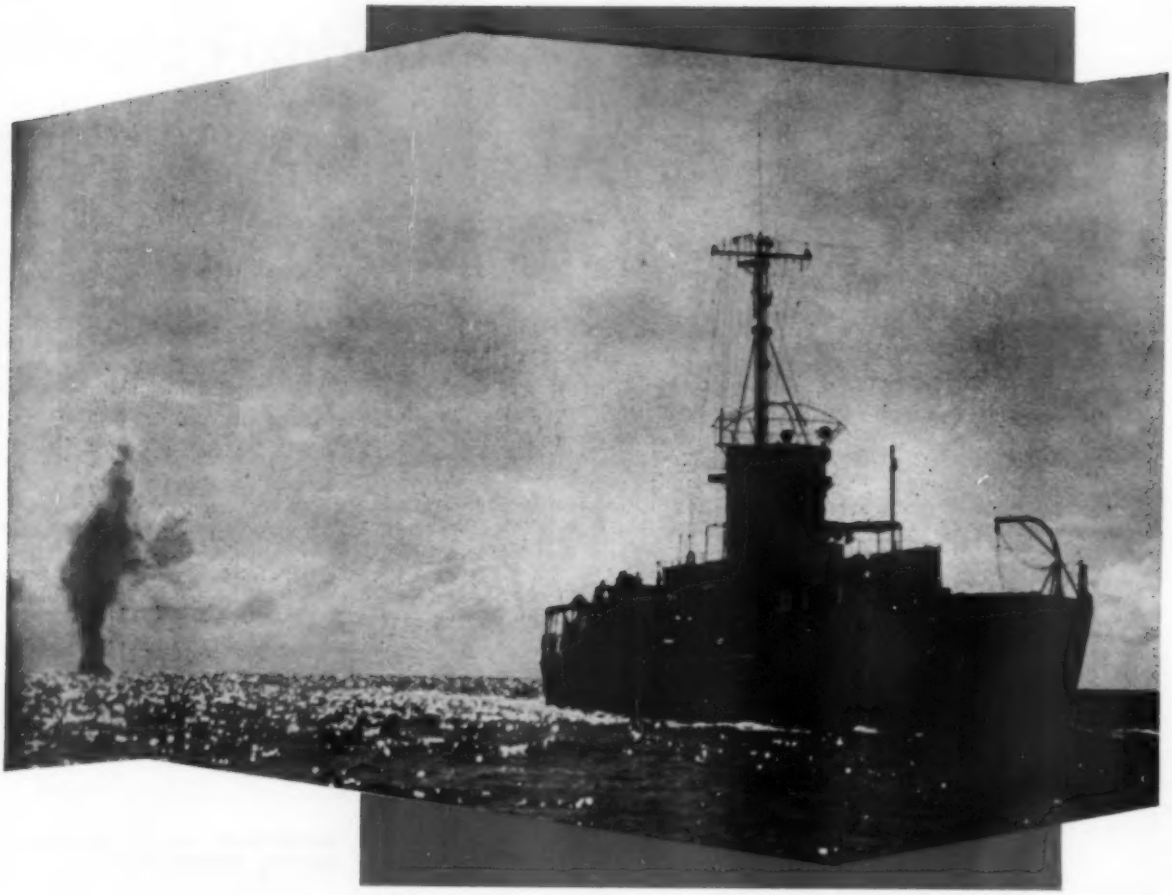
CONTOUR MAP on top of the Devonian lime in Fishhook gas field, Adams and Pike counties, Illinois. This area is far removed from other Illinois production. Fig. 1.



ISOPACHOUS map Silurian lime porosity, Fishhook field.



SILURIAN porosity contour map of Fishhook.



have ship . . . will search

GSI's Motor Vessel SONIC is currently conducting marine seismic surveys in the Eastern Hemisphere. If you are planning offshore exploration in this area, you can:

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Write for additional details on availability of the SONIC, a fully-equipped, 405-ton ocean-going vessel which pioneered the single-ship method of marine seismic surveying.

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Service, condensate-well depth breakdown, October

	Service wells					Field condensate							Wildcat condensate			
	A	B	C	D	E	C	D	E	F	G	H	I	E	F	G	H
Arkansas	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Illinois	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kansas	...	...	5	2	1	...	...	1	...	...	...	...	...	...	...	...
Kentucky	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Louisiana	...	...	...	...	...	1	...	...	2	5	2	2	...	...	1	2
South	...	...	...	...	...	1	...	...	2	3	1	2	...	...	1	2
Offshore	...	...	...	...	...	...	...	...	...	2	1	...	...	...	...	...
Michigan	...	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mississippi	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
New Mexico	...	6	...	...	...	...	...	3	...	...	...	...	...	...	...	...
West	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...
East	...	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...
New York	...	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ohio	...	2	3	...	...	...	...	...	...	...	...	...	...	...	...	...
Oklahoma	2	18	10	...	1	...	5	2	1	...	...	...	...	...	...	...
Pennsylvania	...	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Texas	7	13	12	1	...	...	2	9	14	5	2	...	...	3	3	...
Dist. 1	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...
Dist. 2	...	...	...	...	...	...	...	3	2	...	...	...	...	...	...	...
Dist. 3	...	...	1	...	...	...	...	1	3	3	1	...	...	2	2	...
Dist. 4	...	...	...	...	...	...	1	3	3	...	...	...	...	...	1	...
East	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Dist. 7-B	1	4	...	...	...	...	1	...	...	...	...	...	...	...	...	...
West	...	2	6	1	...	...	...	1	...	...	1	...	...	...	...	...
Dist. 9	6	7	5	...	...	...	...	...	...	...	...	...	...	...	...	...
Dist. 10	...	...	...	...	...	...	...	1	5	...	...	...	...	1	...	...
Utah	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...
Total United States	**10**	**74**	**31**	**3**	**3**	**1**	**8**	**15**	**17**	**10**	**4**	**2**	**1**	**3**	**4**	**2**
Alberta	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...

TABLE 1—FISHHOOK GAS FIELD DATA

Acres leased	11,840 acres
Boundary zero line includes	8,267 acres
Location from Springfield, Ill.	77 miles
Pittsfield, Ill.	12 miles
Quincy, Ill.	45 miles
Panhandle Eastern Pipe Lines 24 in., 26 in., 28 in.	18 miles
Northern Storage Co. lines	60 miles
Gas-Field Data	
Location of gas	Silurian formation
Devonian formation (cap rock), average depth	23 ft.
Silurian-gas rock (water seal, not a water drive)	14 ft.
Number of wells	85
Number of dry wells	15
Number of wells cored	11
Average gas output for 19 wells	1,256,826 cu. ft.
Area included in gas production	8,267 acres
Pressure as of April 7, 1958 . . . original 130	114-115 lb.
St. Peter Sandstone Data	
Depth	1,012 to 1,208 ft.
Thickness of St. Peter sand	196 ft.
Thickness of Trenton over St. Peter sand	298 ft.
Thickness of Blue Shale over Trenton	177 ft.
Closure of St. Peter sand:	
Maximum	170 ft. plus
Minimum	120 ft.
Water content	67% to 72%
Permeability (horizontal) (936 md. for first 100 ft.)	682 md. for 196 ft.
Permeability (vertical)	512 mil.
Porosity	18.8
Number of St. Peter wells in Pike	3

TABLE 2—TYPICAL FISHHOOK WELL

Operator: Harold Lipe
Farm and well: Flynn 1
Location: SW NW SW 27-38s-4w, Pike County
Elevation: 764 ft.
Date drilled: July 25, 1958
Formation: Silurian top equals 455 ft.
Total Depth: 488 ft.
Gas depth: 487 ft. to 488 ft.
Casing: 4½ in. at 469 ft.
Shut-in pressure: 114½ psig., 113½ psid.

Gas volume: In 5 minutes equals 7.9 in. Hg in U-tube side pressure 4 diameters from outlet of 2 in. by 2 ft. flow nipple or 3,050 M.c.f.d. at 0.57 estimated gravity.

In 10 minutes equals 7.1 in. Hg
In 15 minutes equals 6.5 in. Hg
In 20 minutes equals 6.0 in. Hg
In 25 minutes equals 5.6 in. Hg
In 30 minutes equals 5.2 in. Hg
In 35 minutes equals 4.9 in. Hg or 2,800 M.c.f.d.

Buildup pressure:
In ½ minute equals 95 psig.
In 1 minute equals 96 plus psig.
In 2 minutes equals 99 minus psig.
In 3 minutes equals 100 psig.
In 4 minutes equals 100 plus psig.
In 5 minutes equals 101 psig.
In 10 minutes equals 104 psig. (duration of test)

Silurian strata in the area correlate with the Sexton Creek and Edgewood formations of the southern Calhoun County area and are 32-46 ft. thick. The Sexton Creek formation is the caprock limestone and the Edgewood formations below it is the gas horizon which consists of about 15 ft. of porous dolomite.

Operators . . . Most of the wells in the field have been drilled by Harold Lipe, Western Oil & Gas Co., S&S Drilling Co., and Ray Starr.

Flaring . . . Since the field was opened there has been over 1½ billion cubic feet of gas flared from the field and

18 Cat Engines demonstrate power and versatility for offshore drilling operation

Continental-Emsco Company, Dallas, Texas, used Cat power right up the ladder—from the compact D311 to the mighty D397 Engines.

If yours is a drilling operation, you'll be interested in this display of versatile Caterpillar power. From compact diesel electric sets to modern, heavy-duty diesel engines, there's a Cat unit power-right for your needs, either as a complete package or for special installations.

Continental-Emsco recognized that Cat power makes good sense and used Caterpillar Engines for the Lake Maracaibo Drilling Tenders they build for "in stock" delivery. C-E knew that easy accessibility and interchangeability of parts, as well as dependable, 'round-the-clock service, mean less down time and lower operating costs to the operator.

Your Caterpillar Dealer has Cat Engines available from 65 to 650 HP (maximum output capacity) and Electric Sets from 30 to 350 KW (continuous). And a Cat Engine Specialist will be glad to discuss your operation with you. Get in touch, today. He's as near as your telephone. Remember, too, when you order oilfield equipment, specify the power that's matched to the heavy-duty equipment . . . always specify Caterpillar.

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U. S. A.

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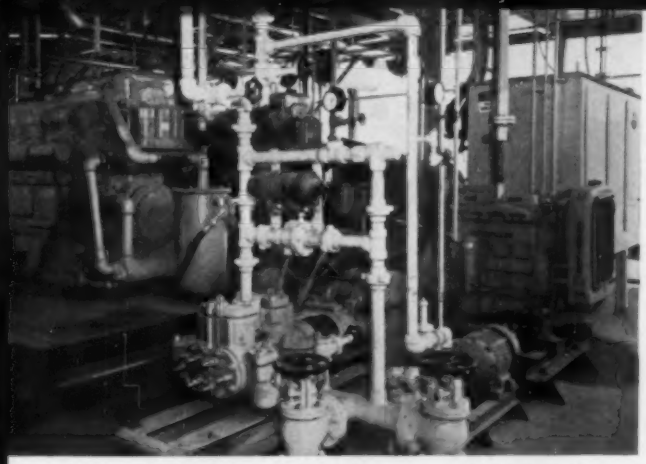
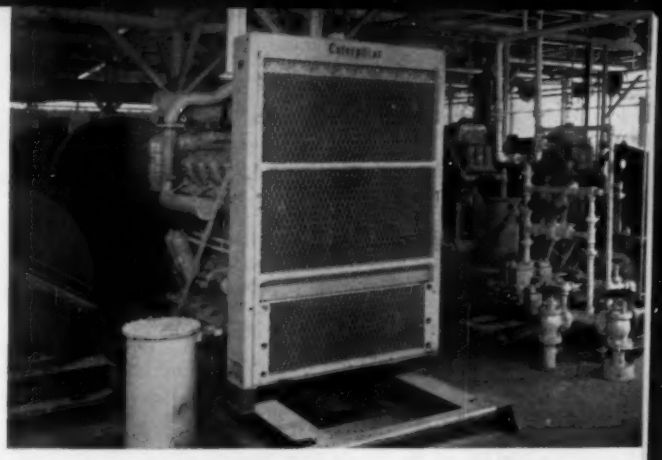
Continental-Emsco Company, Dallas, uses 18 Cat Engines for auxiliary and prime power on the two Lake Maracaibo Drilling Tenders shown here. The tenders are 180' long with 70' beam and 11' 3" draft. Each is equipped with a helicopter deck, 45' x 83'.

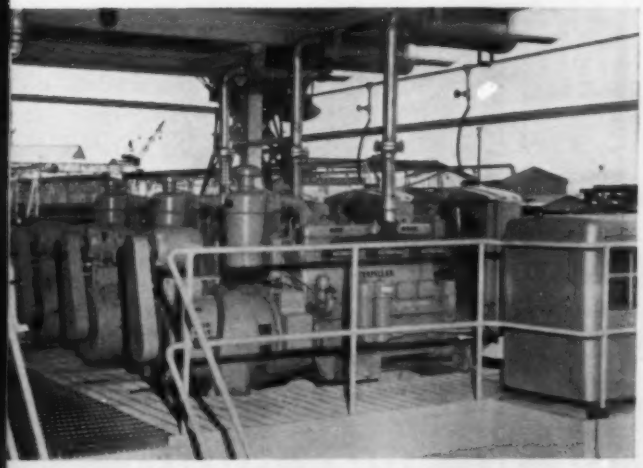


A modern, heavy-duty Cat D311 Engine (right) drives a Gardner-Denver FG-FXG 5" x 6" pump on each tender. These Cat-powered duplex pumps supply raw water for washing down rigs and keeping tenders clean.

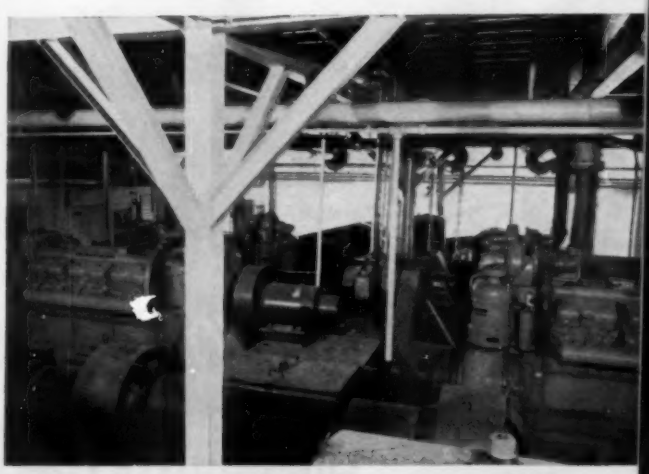


Here a Caterpillar Diesel D375 Engine supplies power for a Gardner-Denver mud pump on each tender. Continental-Emsco Company finds the D375 an excellent power-match for the 7¼" x 14" Model FK-FXK pump.

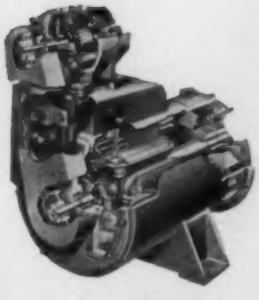
ENGINE POWER BY CATERPILLAR



Three Cat D318 Diesel Electric Sets provide all A.C. electric power for each tender. Uses include excitation for the D.C. rig drive equipment, the generator and motor blowers, mud mixers, water and fuel pumps, and lighting for rig and living quarters.



Four turbocharged Cat D397 Diesel Engines drive Continental-Emsco "Del Lago" type compounding transmissions on each tender. The rigs, intended for service on Lake Maracaibo, Venezuela, have a drilling depth of 12,000 to 15,000 feet.



Modern, heavy-duty Cat Generator: Offering the best features of self-regulated and externally regulated units, the advanced-design Cat Generator has no moving parts in the regulator. Voltage is adjustable from 5% above to 10% below nominal voltage. It affords excellent motor starting ability and it is power-matched to the engine, maintaining steady voltage from no load to full. A heavy-duty, easily lubricated bearing and a well-insulated rotor assembly assure long life and continuous output.

Engine Division, Dept. OG12
CATERPILLAR TRACTOR CO., Peoria, Illinois, U.S.A.

Send me more information about Cat Diesel Engines and Electric Sets for drilling.

☐ Have Caterpillar Dealer call for an appointment as I may be in the market. I understand that I am under no obligation.

☐ Send me more information in general about these engines.

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this has not lowered the pressures much.

Reserves . . . From geological surveys and engineering surveys that have been taken in the field, there appears to be at least 10 billion cubic feet of gas in the Silurian reservoir. There is also 100 billion cubic feet of storage capacity in the St. Peter formation.

This article is an abstract of "Fishhook gas pool, Pike and Adams Counties, Illinois," by Wayne F. Meents, published by the Division of the Illinois State Geological Survey, Urbana. Circular 250 1958. Maps and tables are courtesy of Harold Lipe, Pana, Ill.

California's Tejon nears merger

A WELL being drilled by Kern Oil California, Ltd., gave strong indications of a linkup of prolific North Tejon field and Wheeler Ridge field in Kern County.

The Kern well, 81 KCL, is located midway between the two fields, about 1 mile south of the North Tejon highway area and 1 mile north of the Wheeler Ridge Windgap area.

On a formation test of two zones in the Vedder (Miocene) the well flowed gas at a rate of 7 to 10 M.M.c.f. daily and recovered 270 ft. of condensate.

The operator plans to drill the wildcat to 11,000 ft. Total depth at the time of the test was 9,050 ft

In the highway area of North Tejon, Richfield Oil Corp. completed the field's first dual completion for a total of 531 bbl. daily. This production is split up 228 bbl. of 52.8°-gravity crude through a 12/64-in. choke from an Eocene formation at 10,914-11,331 ft., and 303 bbl. of 43.3°-gravity crude through a similar choke from a Vedder (Miocene) interval at 8,620-8,972 ft.

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Eliminate maintenance and the problem of constant attention by replacing Internal Combustion engines with R&M Single Phase Motors! Sizes above 7½ hp (10, 15, 20 hp) have "cushion start" system as extra-cost option, for reduced current starting. Auxiliary mechanism is externally mounted for simple inspection, even while the motor is running. Motors are fully weatherized against moisture, dirt, heat. Write for Bulletin 470-OGJ
ROBBINS & MYERS, INC.
MOTOR DIVISION • SPRINGFIELD, OHIO

Third San Emidio well completed

THE third successful well in the San Emidio Nose field in Kern County has been completed by Richfield Oil Corp.

The well was brought in making 525 bbl. daily of 32.4°-gravity crude through a 14/64-in. choke. The perforations are at 11,765-11,810 ft., 11,475-11,595 ft., and 11,894-12,017 ft. It is located about ½ mile northeast of the discovery well.

Elsewhere at San Emidio, Bandini Petroleum Co. had a wildcat drilling below 10,048 ft. at a location almost 1½ miles north of the discovery. Richfield had a fourth well underway two locations east of the third completion, and was readying site for a fifth almost 2 miles northeast of the discovery well.

Ward County pool gets second well

IN northern Ward County, Magnolia Petroleum Co. 2 George Sealy was assured of production in the Brushy Canyon section of the Delaware. No. 2 Sealy is a northeast offset to the firm's opener of Delstrat field, which flowed 250 bbl. of oil a day from pay at 7,675-81 ft.

The 2 Sealy flowed oil on a drill-stem test in the Delaware at 7,680-92 ft., and recovered gas-cut mud with light oil shows at 7,628-78 ft.

On the test at 7,680-92 ft., gas surfaced in 5 minutes, mud in 23 and oil in 1 hour and 10 minutes. After cleaning into pits for 50 minutes, it tanked 18 bbl. of oil and 3 bbl. of mud in 1½ hours, flowing through 16/64-in. choke. Bottom-hole flowing pressure was 2,790 psi., increasing to 3,085 psi. when shut in 30 minutes.

. . . BECAUSE it's critical to successful cementing

It pays to put the best on bottom. In field after field . . . run after run . . . Larkin Cementing Equipment has earned the reputation of doing all that cementing equipment can do to contribute to a successful cementing job. Specify Larkin . . . through your supply store.

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LARKIN LEADERSHIP HAS BEEN EARNED BY YEARS OF DEPENDABLE PERFORMANCE

An important announcement to the drilling industry--

Drilling Contractors have found they get up to 50% FASTER DRILLING, 25% LONGER BIT LIFE, SUBSTANTIAL DOLLAR SAVINGS with DOWELL'S new drilling agent--POLYDRIL!

A brand-new aid for the rapid settling of solids in clear water drilling is now available from Dowell. The product is Polydril*, an *easy-to-mix, low-cost,* water-soluble, organic polymer. Polydril helps you increase drilling rates and bit life, and lower water and mud costs.

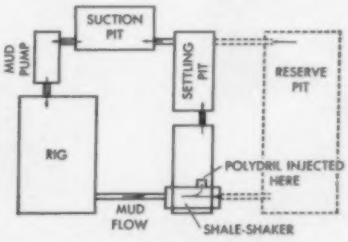
Polydril is, first, a powerful, efficient flocculating agent. But, of special importance, is the fact that Polydril comes to you in a semi-liquid state. This means that it is easy-to-mix, easy-to-use, with no waste or loss. There is no product on the market today quite like Polydril.

POLYDRIL IS EASY-TO-MIX

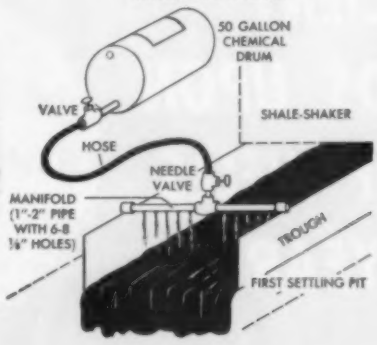
To illustrate the ease with which Polydril can be added to your drilling operation, here are the steps usually followed:

1. Stir the Polydril in the can to a uniform mix just as you would paint.
2. Mix a pint (approximately one-half mud cup or 1 to 1¼ pounds) of Polydril with an equal volume of diesel oil or kerosene.
3. Pour this mixture slowly and uniformly into a stream of water going into a 50-gallon chemical mixing drum. Either fresh water or brine may be used. This makes 50 gallons of treating solution.
4. Inject the treating solution directly into the mud stream between the shale shaker and the first settling pit. Disperse the solution as thoroughly as possible into the stream. A manifold arrangement has been found to be satisfactory for this purpose. (See sketch.) Also, if there is agitation in the mud

DIAGRAM OF FLOW SYSTEM SHOWING POINT AT WHICH POLYDRIL IS INJECTED



MANIFOLD ARRANGEMENT FOR INJECTION OF POLYDRIL



stream at this point, the Polydril will be better dispersed; and the solids will be flocculated more efficiently.

5. For best results, keep agitation at a minimum through rest of the mud system.

OTHER USES OF POLYDRIL

Other than as an aid in clear water drilling, Polydril has several additional applications. For example, it can be used:

To help settle mud pits after drilling operations are completed.

To clear muddy water for use as a fracturing fluid.

AVAILABILITY OF POLYDRIL

Polydril is available at all Dowell stations in handy 5-gallon re-usable cans with handles. Each can contains 50 pounds of Polydril.

New as it is, Polydril has already enjoyed wide success in hundreds of wells. The sum of its advantages—faster drilling, reduced rig time, increased bit and pump-liner life, reduced water requirements, mud savings, mixing ease—makes Polydril an important contribution to the progress of oil well drilling. With all these advantages, Polydril is surprisingly inexpensive; and a small amount goes a long way.

Investigate Polydril. For detailed information and prompt service, call any of the 165 Dowell offices and stations. In Canada, call Dowell of Canada, Ltd.; in Venezuela, United Oilwell Service. Dowell, Tulsa 1, Oklahoma.

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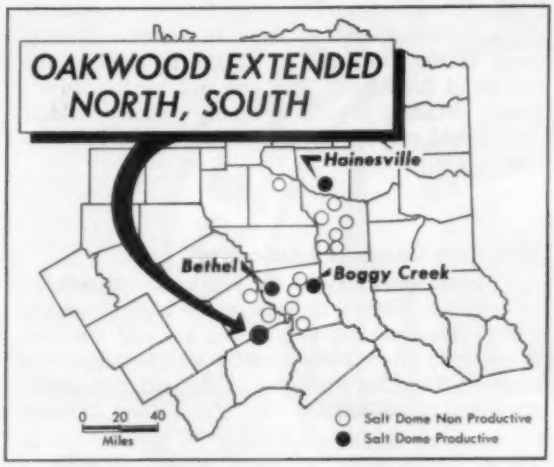


WOODBINE oilers have extended Oakwood Dome area in Leon and Freestone counties.

Salt-dome offset flows Woodbine oil

EAST TEXAS' fourth producing salt dome to have commercial oil production (opened in May of this year) last week got a confirmation well and southwest offset to the discovery.

Further to the south, Oakwood field gained a 1-mile-south outpost. Both wells completed in the prolific Woodbine sand.

Background . . . The Texas Co. opened commercial oil production at Oakwood Dome field at its 1 Arthur Rabe in southeastern Freestone County. The well attracted considerable attention when it drilled a 249-ft. Woodbine section beneath the salt overhang. All of the section was not oil bearing, but at any rate it was an extraordinary thickness for the Woodbine. This well topped the Woodbine at 5,463 ft., then logged 83 ft. of gas and sand between 5,463-5,549 ft., and 166 ft. of oil sand between 5,549-5,737 ft. A 10-ft. section was perforated for completion, from which it flowed 141 bbl. of 36° oil per day through 12/64-in. choke.

Second producer . . . Of equal significance to the discovery was the way in which Texaco approached the salt-dome problem. Detailed seismic surveying outlined the shape of the salt core and overhang, and enabled the company to pierce the overhang precisely at the vantage point. At the Oakwood discovery, operators drilled into the salt around 1,200 ft., penetrated it to 5,285 ft., and hit the pay sands 178 ft. later.

The Texas Co. 2 Arthur Rabe, T. J. Teal Survey, A-774, was completed last week. It is 2 miles northwest of Keechi townsite in Freestone County, and a southwest offset to the field discovery.

The 2 Rabe had a lot of mechanical trouble, and was finally completed in its third sidetracked hole. Top on the Woodbine had not been reported at this writing, but it drilled out of the salt at 5,261 ft. Total depth was 5,891½ ft. On tests the well flowed 73 bbl. of oil in 14 hours through 12/64-in. choke, under tubing pressure of 725 psi. Completion potential was 97 bbl. of 33° oil a day through 13/64-in. choke, with tubing pressure of 400 psi., and gas-oil ratio 470:1.

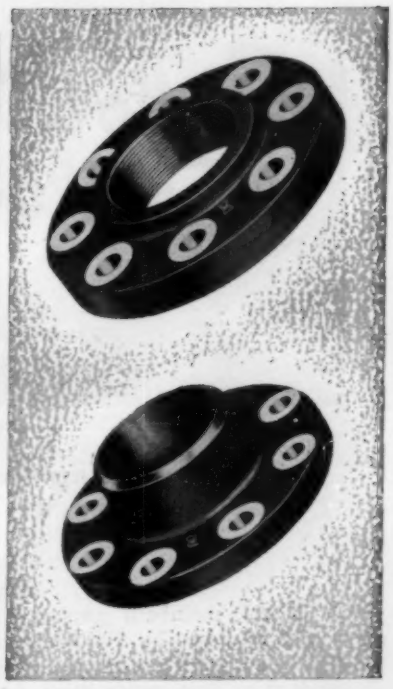
Oakwood extension . . . On the Leon County side of Oakwood dome, T. J. Johnson and Associates, Tyler, completed 1 R. H. Bell as a Woodbine oiler. Location in the James C. Anderson Survey, A-40, is 1 mile south and slightly east of nearest Woodbine gas production in Oakwood field.

Initial potential was 100 bbl. of 36° oil a day through 12/64-in. choke, from open hole in the Woodbine at 5,859½-61 ft.

Successful development of the known salt domes in East Texas has been slow. Production at four of them —Hainesville, Boggy Creek, Bethel, and Oakwood—has been slightly less than spectacular. The latter two domes are lending much encouragement.

Bethel field . . . The Texas Co. has continued its drilling program at Bethel salt dome in Anderson County. Latest completion was the 8 E. C. Williams in J. N. Acosta Grant, Thomas H. Kingsley Survey.

The well found a thick Woodbine section, going into the sand at 5,366 ft. Operators ran electrical log to 5,954 ft., total depth, then took 40 side-wall cores. Shows of oil were reported in 39 of these cores. Perforations at 5,620-30 ft. flowed 110 bbl. of oil a day through 12/64-in. choke. Location is 7 miles northwest of Tennessee Colony townsite.



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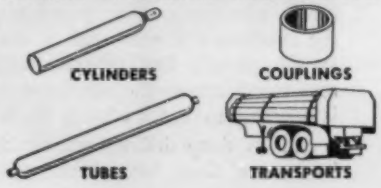


. . . appraising the future by surveying the past

A BOLD, multibasin exploratory game is under way in New Mexico. For years the southeast corner has been a prolific producer . . . for the past decade wildcatters have gotten more daring in the northwestern corner. November's wildcat survey reveals wildcats and wildcat plans sprouting in the southwest, in the Lucero basin, in Otero County, at the west end of the Palo Duro basin, and in the elusive Raton basin (on the Colorado side). Discoveries and deep tests keep the San Juan and Delaware basins busy in this diversified southern Rocky Mountain campaign.

New Mexico activity includes

. . . heavy leasing in the Lucero basin covering an area of 4,000 sq. miles. This newly recognized basin will be one to keep an eye on . . . an intense lease play in Otero County in the south involves 250,000 acres . . . northeastern New Mexico's recent lease spree is backed up with the first wildcat to be drilled in the Tucumcari embayment. It is Sunray's 1 Briscoe in Quay County, headed for 10,000 ft. for a look at virgin strata.

. . . Humble is providing surprises at its 12,000-ft. Pennsylvanian wildcat in Hidalgo County in the southwest.

. . . On the north side of the Raton basin in Las Animas and Huerfano counties, Colorado, Pan American will drill 10 wildcats on Lewis-Raton Co. acreage with Cretaceous rocks in mind.

. . . Pennsylvanian gas production in eastern Chaves County gives that area its first such producer. The discovery well is Hall 1-G State. It forces another look at Pennsylvanian prospects on the northwestern shelf east of Roswell. New interest in the prolific but far-from-tapped Abo Permian reef trend across the southeast corner of the state is popping up on the edge of the Delaware basin.

. . . A deep drilling era for the San Juan basin has more than two dozen wildcats looking for Upper Cretaceous rocks (the Dakota instead of the much-sought-after Gallup). In addition, Shell is going to the Devonian at 12,000 ft. right in the middle of Bisti field. This one will be San Juan's fourth ultradeep test. It is a long-expected wildcat that should provide valuable stratigraphic information.

Western Canada explorers

. . . tapped what may be the year's most significant oil find for Alberta at Shell et al. 12-9 Simonette River. This new reef find flowed gas and 400 bbl. of oil daily from Woodbend-Upper Devonian. Location is 29 miles northwest of Berland River. The discovery opens another vast area to reef hunting.

Canada's depth record went by the wayside at Texaco et al. 8-28 Simonette. The new mark is 15,283 ft., breaking the old record set at Lambert Creek at 15,195 ft. last year.

Rocky Mountain exploration

. . . continued to gather new laurels with discoveries of note in Montana and Wyoming. Two important Green River basin gas finds were completed by Pubco Petroleum Co., further confirming the high potential of the area near Desert Creek.

The predicted jump into Pennsylvanian rocks on the east side of Powder River is fact. Minnelusa oil was tapped by Pan American east of Donkey Creek field in Crook County, Wyoming . . . Lost Cabin field on the north side of Wind River basin got an oil strike. Though small, it should push the hunt for production in this highly complex region.

. . . Northwestern Montana's Red Creek area in Glacier County is the scene of a fast-moving Cut Bank and Madison oil and gas development . . . Remote Devonian production was opened in the Outlook area in northeastern Montana, lighting waning hopes for this pre-Madison region.

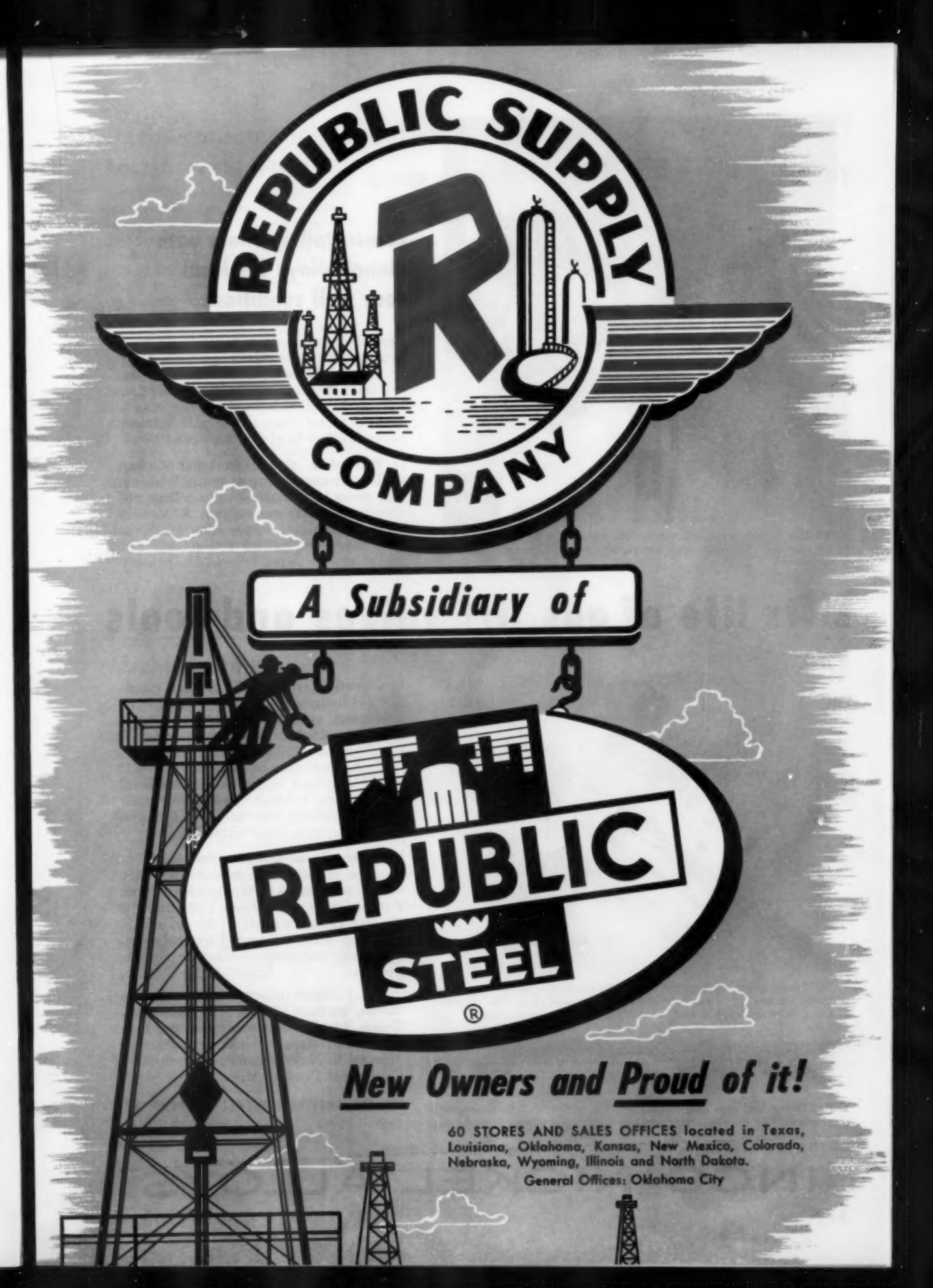
A sensational shallow play

. . . in Central Kentucky has uncovered nearly 600 oil producers in the past few months. Cable tools are pushing this figure higher daily. Production is shallow. Location is near Greensburg in Green County. Daily output is more than 14,000 bbl. from a 400-600-ft. sand.

Pennsylvanian discoveries

. . . in northwestern Kansas include a new pool in Rawlins County with production from the Marmaton, and a west extension to Llanos, birthplace of this Las Animas country oil hunt. Llanos now has two Marmaton wells, one Cherokee, and one Lansing-Kansas City producer.

John C. McCaslin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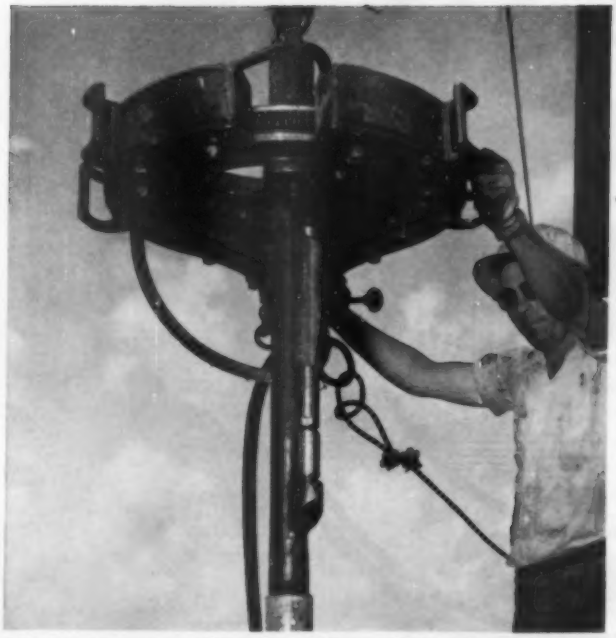


All-Monel Camco gas lift valve, with mandrel, made up in tubing string. Well is in Southwest Texas, where corrosion problems are common.

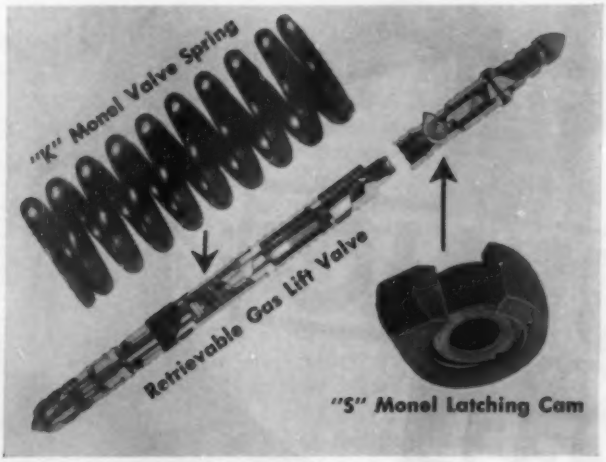
...Camco tailors them with Monel alloys for local sour well conditions

Gas lift payout often depends on how long the downhole valves and tools stand up to corrosive well fluids and abrasion.

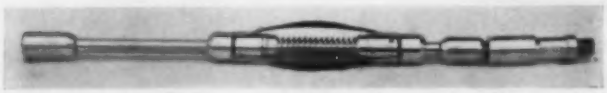
Camco designers make sure their gas lift valves will stand up . . . they use 3 Monel* nickel-copper alloys in critical parts to offset local sour well conditions.

In Wyoming, Camco found that sour wells were chewing up ordinary latching tool cams in 6 months or so. They replaced them with cams of cast "S" Monel* hard-grade nickel-copper alloy which resists corrosion, galling and seizing . . . and works for years. (See middle photo.)

Lifts life of gas lift valves and tools



"S" Monel alloy latching cam has high hardness, corrosion resistance, stands up to years of pulls, in acid and sand. "K" Monel alloy valve spring has high elasticity, corrosion resistance.



Retrieving tool uses Monel alloy spring, serves well in hydrogen sulphide. For extreme corrosive conditions, rest of tool is made of "K" Monel alloy.

In Canada, certain wells produce quantities of hydrogen sulphide—so corrosive that steel springs in retrieving tools have crumbled in the fingers after 3 hours in the well. Most other metals do little better. Camco depends on "K" Monel* springs which go hundreds of round trips without visible corrosion damage. Usually, they last as long as the rest of the tool. (See bottom photo.)

In Mexico, Texas and Canada, some fields produce acidic crudes loaded with H_2S, brines, carbonates; often in combination. For these tough conditions, Camco makes gas lift valves entirely of Monel alloys. (See top photo) Camco men state emphatically that other metals just don't do the job.

For further information on Camco valves, contact Camco, Inc., Houston, Texas. And for proven ways to use Inco alloys in boosting tool life, write Inco for "Metals to Make Petroleum Production Equipment Produce More."

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Pecos confirmation test flowing gas

A SECOND GAS WELL was in sight last week at Hunt Oil Co.'s remote strike in southern Pecos County. Hunt 53 Elsinore was said to have made gas flows on tests between 11,955-12,060 ft., and 11,910-55 ft. Total depth was 12,295 ft. Operators ran 5½-in. casing for completion attempt.

The field discovery was Hunt 52 Elsinore. Calculated gas potential was 4,100 M.c.f. of gas from Devonian perforations at 11,432-72 ft.

The 53 Elsinore is a 1-mile south extension. Location is Section 24, Block D, GC&SF Survey, 25 miles south of Fort Stockton.

Phillips Petroleum Co. continued testing its 1-A Harral, Wolfcamp discovery 15 miles southeast of Fort Stockton. The well kicked off after acid treatment of perforations at 14,580-14,670 ft., and flowed at the rate of 37,729 M.c.f.d. Choke size was ¾-in. After 19 hours the volume had decreased to 25,752 M.c.f. Two additional gages were at the rate of 13,109 M.c.f., and 18,432 M.c.f. Testing continued.

Fish job delays Michigan finale

FISHING JOB has delayed completion of one of the hottest wildcat tests of the year, Mask and McClure 1 Rosenau, NW NW SW 23-3s-4w, Calhoun County, after logging 2,800 M.c.f. of gas and show of oil in Trenton dolomite at 4,085 ft.

Test was rotary drilled to 3,902-ft. casing point and then converted to machine for completion.

Meanwhile, an estimated 35,000 to 50,000 acres of leases have been written in a 12-mile long area of the test with both major company and independent action.

San Juan basin fields coupled

GALLUP PRODUCTION at Atlantic Refining Co.'s 1 Ute in C SW SW 36-31n-16w, San Juan County, has joined Horseshoe Canyon and Verde fields in northwestern New Mexico's San Juan basin.

The well pumped 95 bbl. of oil daily from Tocito-Gallup perforations at 1,614-60 ft. This discovery is about in the middle of the 2-mile gap between the fields. A dozen new locations in the two fields in the past 2 weeks illustrates the firedup interest here since last summer.

Duff-Norton ball bearing screw jacks can't creep or drop—will hold loads indefinitely

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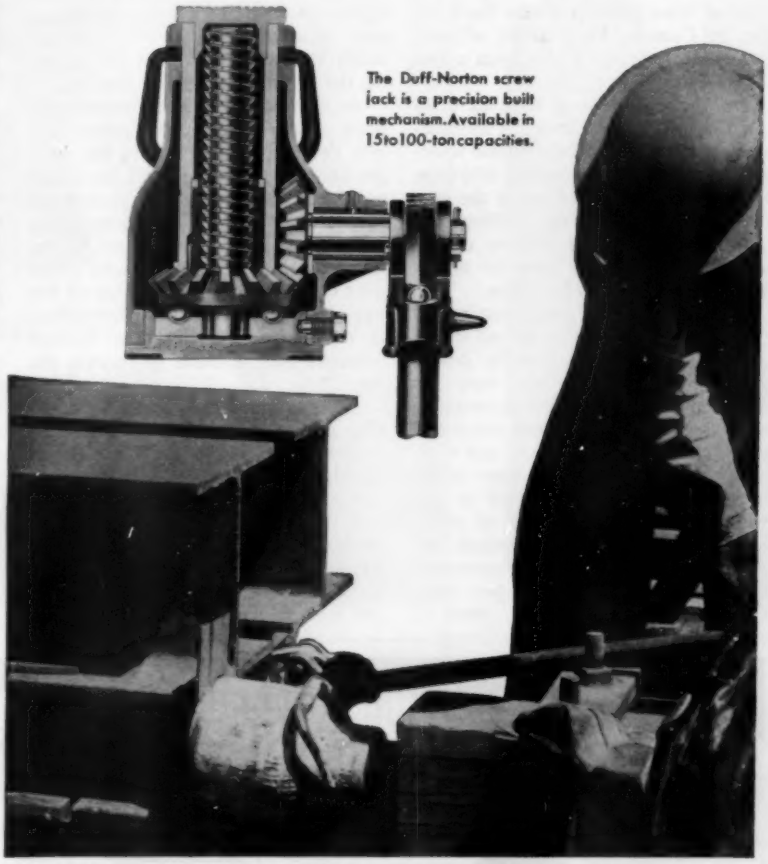

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In Alberta

Six rigs will probe Simonette River

ONE OF THE LARGEST followup drilling programs to a single discovery well in western Canada is in the offing for the Simonette River region of Central West Alberta where Shell Oil Co. of Canada, Ltd., struck oil and gas in the D3 reef of Devonian a few weeks ago.

It is believed that at least six drilling rigs will be put to work immediately in an attempt to define the structure that at its best, during drill-stem test operations, flowed oil at the rate of 400 bbl. per day. This drilling program, in the general vicinity of the discovery hole, lies 170 miles northwest of Edmonton city limits.

Shell controls a great portion of the acreage surrounding the oil strike, although it and other wells drilled previous to the discovery, were put down on acreage acquired under farmout agreement from a team comprised of Petrol Oil & Gas, Ltd., and Central Explorers Co. At the time of the farmout, the lands included in the agreement were in the form of petroleum and natural-gas reservations, but the tracts have since been converted to petroleum and natural-gas lease. In addition to those lands, Shell on its own purchased rights to a number of drilling reservations in the area.

It is understood that four of the six scheduled tests will be drilled on the rights selected out of the petroleum and natural-gas reservation tracts; while the other two will be drilled on the drilling-reservation parcels.

At the discovery hole, trouble has been encountered as the perforating gun that was being run in the hole got hung up on casing and it has taken almost a week to drill a portion of that tool out with the remainder, along with a packer which was set in the hole being forced to the bottom. Plans now call for the upper portion of the pay zone to be evaluated first and—if necessary following that—further attempts will be made to recover the "fish."

Hot area . . . This general region of Alberta is currently the hottest spot in western Canada and has good reason to be. Earlier in the year Shell and British American Oil Co., Ltd., discovered natural gas at their A8-4 Berland River exploratory test and it turned out to be the largest natural-gas well in the world, containing a calculated open-flow potential of 1½ billion cubic feet per day. That test, coupled with the more recent Simonette discovery hole, which lies 29 miles northwest, has made the region one of the most promising since possibly Virginia Hills and most surely Redwater-Leduc Woodbend-Sturgeon Lake. Those latter fields are all D3 reef producers primarily while Virginia Hills is a middle Devonian-Beaverhill Lake producing region.

Big winter ahead . . . Other companies have also entered the search in the past few days and exploration in this region will combine with that being carried out in the Swan Hills-Virginia Hills area to make the coming winter season in Alberta one of the most promising and interesting in recent years.

One of the companies making a new start in the general district, Phillips Petroleum Co., has possibly the most interesting wildcat test as it has come midway between the two strikes for the attempt. The only other announced to date is going to be drilled by Ohio Oil Co.-Atlantic Refining Co. team, and its test is about 14 miles northeast of the Berland River strike.

The first followup test by the Shell-British American team to the Berland River hole is nearing 7,500 ft.

NEW

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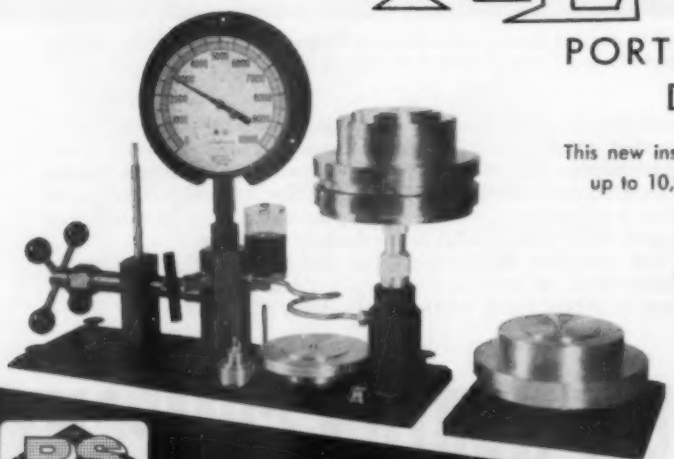

This new instrument from Refinery Supply measures pressures up to 10,000 psi. Pressure interval is 1 psi. The tester and weights come in separate metal carrying cases. Includes a hand jack and hand set, one each of ¼" and ½" gauge adapters, and a 10 foot length of 10,000 psi tubing with connections. The pressure gauge is not included. $700. Order catalog number #9026.

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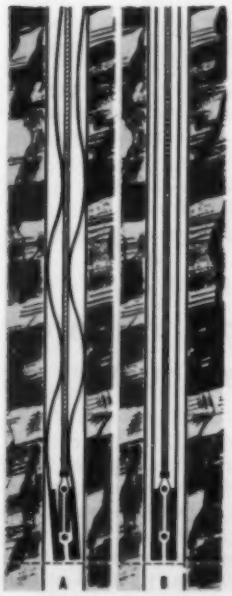

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Fields grow in NW Oklahoma

SUCCESS continues its reign over northwestern Oklahoma exploration. New pays, prolific extensions, and reworked dry holes are making the news.

West Shattuck . . . Magnolia Petroleum Co. has opened a new pay in the northwestern Oklahoma area at 1 Brown in C NW SE 23-21n-26w, Ellis County. This West Shattuck field well found gas in the Cleveland sand. Flow was 1,020 M.c.f.d. on test of perforations at 7,646 to 7,725 ft. Regular field pay is the Morrow. Both sands are Pennsylvanian.

Another well, 1 Barcafer and Wilson in C SE NW 25-21n-26w, also found some gas in the Cleveland. There is Cleveland sand production in scattered areas of the northwestern Anadarko basin, but it is new to this section of Oklahoma.

Hardesty . . . Inside-Hugoton operations continue to net big gas wells. Westhoma Oil Co. 1 Janzen, C NW SE 1-3n-17eCM, Texas County, Oklahoma Panhandle, flowed 75 M.M. c.f.d. of gas on open-flow potential from the Morrow sand at 6,274-92 ft.

Southeast Griggs . . . This Cimarron County field has a two-zone discovery at The Texas Co. 2 Youtsler in C SW SE 23-1n-9eCM.

Both Topeka and Kansas City lime production is indicated at the well. Perforations in the Topeka-Pennsylvanian at 3,380-3,420 ft. got 4,162 M.c.f.d.; flow from the Kansas City lime at 3,766-72, 3,732-56, and 3,913-20 ft. was 3,531 M.c.f.d. The pool's pay zones are the Atoka and Morrow, or basal Pennsylvanian.

Northeast Cheyenne Valley . . . This Major County field is one of the most prolific new areas in northwestern Oklahoma.

Cities Service Oil Co. reworked an old dry hole (originally drilled by Indian Territory Illuminating Oil Co. in 1935) at 1 Fairview in C SW SE 32-22n-14w. Oil flowed at the daily rate of 1,044 bbl. on 22/64-in. choke from perforations in the Cherokee-Pennsylvanian sand at 6,856-6,906 ft. The 7½-hour flow was 326 bbl. This new field boasts eight good producers. Location is about 20 miles west of Ringwood field in a previously oil-barren area.

ANOTHER VIKING PUMP MONEY-SAVING INSTALLATION

for Standard Oil of Kentucky

8 - inch Heavy - Duty Viking Pump unit, with totally enclosed herringbone gearing.

Because of past experience with Viking Pumps, Standard Oil Company of Kentucky selected this large pumping unit for installation at their Jacksonville, Florida marine terminal. The pump's job is to load barges, transports, and tank trucks with Bunker C oil at 120° F. with a viscosity of 1450 SSU. Standard's engineers advise that the pump is delivering more than its rated capacity against 100 PSI discharge pressure, and they are well pleased. This installation is one of many Viking twin and single pumping units in bulk plants, oil canning plants, and other terminals in Standard Oil of Kentucky's 5-state territory. In addition, they use many Viking Pumps mounted on tank delivery trucks. If you, too, need pumps with fast self-priming and smooth, even flow to give outstanding performance at low cost, check on Viking Pumps. For information, write for bulletin CT.

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New pay added in Sooner State

AN IMPORTANT ADDITION to Ordovician production at Northeast Alden field in Caddo County, southwestern Oklahoma, was completed by Sinclair Oil & Gas Co.

The company's 2 Dyer, C NW SW 1-6n-13w, flowed 308 bbl. of oil per day on 11/64-in. choke from the first Bromide sand at 8,788-8,898 ft. The second Bromide at 8,949-81 ft. got 87 bbl. of oil in 9 hours on 11/64-in choke. This field was opened at the 1 Susie 2 years ago.

New pool indicated in Tulsa County

A NEW-FIELD DESIGNATION and discovery allowable will be requested by Vista Petroleum Corp. for its 2 Durell in NW SW NE 26-18n-12e, Tulsa County, northeastern Oklahoma.

The Burgess sand, topped at 1,628 ft., was perforated at 1,640-50 ft. with four bullets per foot. The well was making ½ bbl. of oil per hour natural before fracturing treatment. Completion gage through 21/64-in. choke

was 168 BOPD with casing pressure of 480 psi.

Herring & Davis of Tulsa were contractors on the hole.

Colorado adds Prowers well . . .

PROWERS COUNTY in southeastern Colorado is officially a new producing county for the state. Excelsior Oil Co. 1 Bailey in NE SW 27-25s-45w, flowed 4,160 M.c.f.d. of gas on test of the Morrow-Pennsylvanian sand at 4,912-22 ft.

This remote wildcat is 35 miles from any production and is a definite uplift for exploration in the near-barren Las Animas arch country. This development plus the tremendous success of exploration in northwestern Kansas in recent months promise a busy winter ahead for explorers in the western Great Plains.

. . . and gets new drilling projects

COLORADO'S portion of the Raton basin is in for some renewed wildcat activity. Lewis-Raton Co. of Denver announced plans for 10 wells in the basin. Pan American Petroleum Corp. will drill the series of wildcats.

The first five wells are up for drilling bids. Locations are yet unknown. Location is on a 100,000-acre tract of Lewis-Raton Co. acreage in the western portion of Las Animas and Huerfano counties.

These new wildcats will test the Cretaceous-Trinidad sandstone. There will also be three Dakota tests in the same area.

Kansas well hints Pennsylvania pay

LANSING-PENNSYLVANIAN production is hinted at a wildcat in Haskell County, southwestern Kansas. The possible discovery is W. J. Coppinger 1 Koenig in C NE NW 12-29s-34w, about 7 miles north of the town of Satanta.

A drill-stem test in the Lansing at 4,142-78 ft. got 50 ft. of oil and gas-cut mud and 150 ft. of slightly oil and gas-cut mud. Another test also had shows at 4,515-40 ft. as did one at 4,591-4,609 ft. Location is 3½ miles east of South Eubank field, a recent discovery. Both areas are deep inside Hugoton gas field.

Hugoton tests hit Morrow pay

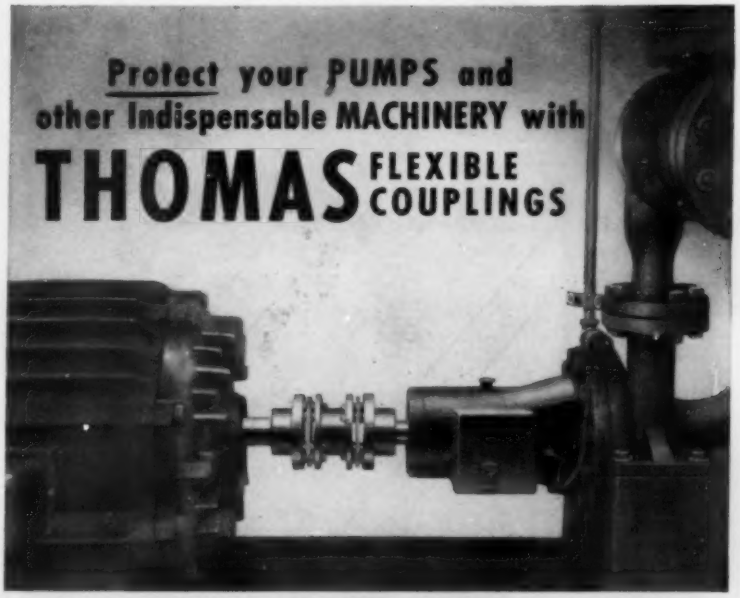
TWO WILDCAT upper Morrow gas discoveries in the Anadarko basin in Kansas, Oklahoma and Texas, were announced by Panhandle Eastern Pipe Line Co.

In addition, the company announced the recent completion of two development wells—one gas, one oil.

One of the wildcats is 1-7 Perrill, 7-31s-37w, Stevens County, Kansas. A drill-stem test of an upper Morrow sand covering the interval 5,327-80 ft. discovered 7 M.M.c.f. in 15 minutes with bottom-hole shut-in pressure of 1,695 psi. Drilling will be carried on into the Mississippian.

The second wildcat is 1-4 Brillhart, located in Section 4, Block 1, WCRR Survey, Hansford County, Texas. A drill-stem test of an upper Morrow sand at an interval of 6,799-6,833 ft. recovered 7,780 M.c.f. in 10 minutes with bottom-hole pressure of 1,900 psi. Drilling is being continued to the Mississippian.

One of the development wells is a 3,000-bbl.-a-day oil well. It was completed in the "G" sandstone of the



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lower Morrow in Taloga field of Morton County, Kansas. The well, known as 03 Riley, is located in 35-34s-42w.

The second development well is a diagonal stepout known as 1-7 Broce, in 7-4n-13eCM, Texas County, Oklahoma. The well was completed as an upper Morrow gas well with a wellhead absolute open flow of 45,182 M.c.f.

Rank Kentucky test abandoned

IN CLAY COUNTY, 7 miles southwest of Manchester, the county seat, Pan American has a dry hole at its 1 Kizzie Reynolds, a rank wildcat for the area.

A shaly tight section of the Corniferous formation was encountered thus precluding any productive zones. Test topped Ordovician strata at 1,840 ft. and was abandoned at a total depth of 1,845 ft.

Kenai test fishing

Standard Oil Co. of California was fishing stuck drill pipe in the 11,653-ft.-deep 3 Swanson River unit test on Alaska's Kenai Peninsula.

Oil comes to Wind River's north side

WYOMING'S Wind River basin is the center of wildcat interest in the Rocky Mountains this week. Significant discoveries are reported in the Lost Cabin area on the complex north side of the basin in Fremont County.

The California Co. confirmed completion reports of the 1 Government in C SW NW 10-38n-90w. The well flowed 256 bbl. of oil per day, cut 6/10% water. Choke was 16/64-in., gravity 36°. Perforations are in the Wind River Tertiary at 3,171-83, 3,189-3,202, and 3,204-10 ft. This discovery is a new pay for the Lost Cabin area which lies about 1 mile northwest of the 1 Spratt gas discovery in SE SE 5-38n-90w. That well completed in the Cretaceous last year for 4,875 M.c.f.d. from deeper perforations at 8,793-8,948 ft.

Another completion last week in this area is the 1 Government-Langsdorf in NE NW Lot 2, 5-38n-91w. This well pumped 38 bbl. of oil daily, cut 13% water. Production is also from Wind River perforations at 4,155-78 ft. This well is at West Lysite, 7 miles east of Lost Cabin.

The California Co. is now preparing for a second Wind River test at 2 Government in NE NE SW 10-38n-90w. It will go to 4,000 ft. as a southeast offset. Another wildcat in the area east of Lost Cabin on the Madden Unit is shut down for repairs with total depth at 11,395 ft.

The 1 Unit, a California Co. wildcat, reportedly flowed up to 8,500 M.c.f.d. of gas at about 7,300 ft. If true, this north flank of the basin is going to be on fire. Interest in this complex region began last year when gas was found at Badwater and Lost Cabin. The area has no production except these mentioned pools and is a wide-open wildcat territory.

Wind River-Tertiary is the same as Wasatch in other Wyoming areas. There has never been much interest in the Wind River in Wind River basin. Tertiary production is more common elsewhere, especially in Green River basin.

Linn County test drilling

Linn County Oil Development Co. was drilling below 3,800 ft. on its wildcat near Lebanon in Linn County, Oregon.

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THE OIL AND GAS JOURNAL

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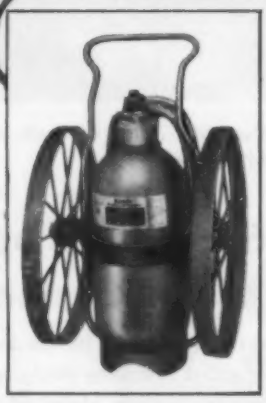

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Coastal Louisiana keeps fast pace

OPENING of two new fields in southeastern Louisiana last week raises the number of new-field discoveries in that state's coastal region for this year to 53.

Forty-six new fields had been opened in South Louisiana this year up to October 1 (OGJ, Nov. 3, p. 141). Since then there have been eight additional discoveries.

Latest discoveries are a new oil field opened by American Natural Gas Co. and Shoreline Drilling Co. in Plaquemines Parish, and another gas-condensate producing area found by Mississippi River Fuel Corp. and Hope Natural Gas Co. in Lafourche Parish.

Discovery well of the former is the operator's 1 John Meyer, located near the west bank of the Mississippi River about 3 miles northeast of deep extension production in the Lake Washington area. It tested more than 200 bbl. of 32°-gravity oil per day, flowing through ⅛-in. choke. Its pay is perforated at 11,387-11,407 ft.

The Lafourche Parish discovery is about midway between East Golden Meadow and Lake Enfermer fields. Discovery well, 1 Lafourche Realty, flowed at the rate of 4,000 M.c.f. of gas and 18 bbl. of 53°-gravity condensate daily through ⅜-in. choke. Producing zone is at 12,648-51 ft.

Mississippi River Fuel and Hope Natural have another new discovery in Lafourche Parish that may be designated as opening another new field. It is on their Gulf States Land & Industries lease about 1¾ miles southwest of nearest production in Lake Boeuf field, northwest of Raceland. The well is completed at 12,659-85 ft. with a flow rate of 2,950 M.c.f. of gas and 338 bbl. of 46°-gravity condensate per day. Flow was through ¼-in. choke with pressure of 3,900 psi.

New gas-condensate production also has been opened in a wildcat drilled by Petroleum, Inc., and Harry Hurt, Inc., about a mile southeast of East Houma field, in Terrebonne Parish. The well, 1 Cole, flowed at the rate of 2,400 M.c.f.d. of wet gas through 5/32-in. choke with pressure of 4,350 psi. Its pay is perforated at 11,285-88 ft.

Pan American Petroleum Corp. has completed a two-zone gas-condensate extension well about a mile south of Lake Raccouri field in Lafourche Parish. The well, 1 State Lease 3258, in Timbalier Bay, was drilled to 16,000 ft. It flowed 5,190 M.c.f. of gas and 323 bbl. of condensate per day through 15/64-in. choke from its

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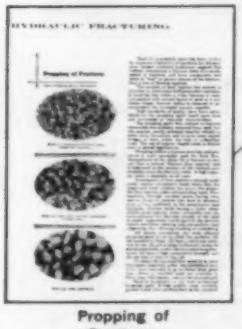

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upper pay at 12,954-64 ft., and 5,200 M.c.f. of gas and 332 bbl. of condensate per day through 16/64-in. choke from the lower zone at 14,954-64 ft. and 14,908-22 ft.

Wyoming has two new gas finds

RED DESERT in Sweetwater County, Wyoming, now boasts two new gas discoveries.

Pubco Petroleum Co. completed the 34-1 Federal in C SW 34-21n-98w, for 2,550 M.c.f.d. from the Lewis-Cretaceous at 4,778-92 ft.; and, the 8-1 Federal in NE SW NE 8-20n-98w, for 40 M.M.c.f.d., calculated open flow, from Almond-Cretaceous at 5,503-22 ft. This well is 1½ miles southeast of the 34-1 Federal.

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Successful wildcats

SOUTH LOUISIANA

Calcasieu Parish: The California Co. 1 Noble et al. 3, 11-11s-11w, 3 miles south of Pine Ridge field. IP 390 BOPD and 4,164 M.c.f.d., ⅛-in., 48.5°, TP 6,900 psi., perf. 11,564-89 ft. TD 12,045 ft. New-field discovery.

Beauregard Parish: Penton & Penton 1 Powell, 31-6s-11w. IP 21 BOPD, 1 M.M.c.f.d., 5/16-in., 65°, TP 575 psi., perf. 8,314-21 ft. TD 9,165 ft. New pay in West Oretta field.

Lafourche Parish: Mississippi River Fuel Co. et al. 1 State Lease 3069, Lake Salvador. IP 59 BOPD, 3/32-in., 34.7°, GOR 171 cu. ft. per bbl., TP 550 psi., perf. 4,819-26 ft. TD 11,500 ft. New pay in Lake Salvador field.

MICHIGAN

Mason County: D. B. Van Raalte 1 Schober, NE NW SW 26-17n-17w, Riverton Township, 2½ miles south of Riverton pool; IP 81 BOPD, Traverse lime 1,652-58 ft. TD 1,660 ft. New oil discovery.

MISSISSIPPI

Marion County: Humble Oil & Refining Co. 1-B Hart, 26-1n-14e. IP 1,482 M.c.f.d., 40 BCPD, 3/16-in., 55.1°, TP 2,650 psi., perf. 8,994-9,005 ft., Lower Tuscaloosa, and 2,332 M.c.f.d., 11½ BCPD, 9/64-in., 51.9°, TP 3,400 psi., perf. 11,724-44 ft., Paluxy. TD 14,422 ft. Paluxy discovery well in Sandy Hook field.

SOUTHEAST NEW MEXICO

Lea County: Continental Oil Co. 5-M Bell Lake Unit, 1-24s-33e, 1-mile west extension and new-pay discovery to Bell Lake (Devonian gas) field. IP 7,400 M.c.f. gas, 1-in. choke, Morrow-Pennsylvanian 14,417-54 ft. TD 16,100 ft., elev. 3,656 ft. Shut-in pressure 6,603 psi.

EAST TEXAS

Leon County: T. J. Johnson 1 R. H. Bell, James C. Anderson Sur., A-40, 10 mi. SE Oakwood, 1 mile south of Oakwood field. IP 100 BOPD, 12/64-in. choke, TP 250 psi., GOR 140:1, 36°, Woodbine 5,859½-61 ft. TD 5,861 ft.

Rusk County: Phillips Petroleum Co. 1 Brown estate, Jacob Bennett Sur., A-75, 6½ miles northwest of Henderson, 1½ miles northwest extension to Henderson field. IP 1,300 M.c.f. gas, plus 37 BCPD, 18/64-in. choke, TP 750 psi., 57°, Travis Peak 7,459-71 ft. TD 7,763 ft.

NORTH TEXAS

Wilbarger County: Tom B. Medders 1-B Charlie Matysek, 9-8-H&TC, 12 miles southwest of Vernon. IP 277 BOPD, 40°, GOR 200:1, Canyon limestone 3,194-3,202 ft. TD 3,202 ft., elev. 1,336 ft.

SOUTHWEST TEXAS

Medina County: Richardson Investment Co. 3 Lamkin, Lot 12-A, Block 12, 2½ miles northwest of Lytle. IPP 19.36 BOPD, 29°, open hole 927-47 ft., Navarro. TD 947 ft. New pay in Fairfield field.

TEXAS GULF COAST

Galveston County: Shell Oil Co. 1 State Tract 195-S, East Galveston Bay, 15 miles northeast of Galveston, AOF 48 M.M.c.f.d., GLR 73 M.c.f. per bbl., 52.9°, shut-in. TP 3,209 psi., perf. 9,390-9,405 ft., upper Frio. TD 11,772 ft. New field.

TEXAS PANHANDLE

Sherman County: The Texas Co. 1 F. A. Judd, 2 miles northeast of Stratford gas field, 10½ miles north of Stratford town in Sec. 5, Blk. 1, PSL Sur. IPP 71 BOPD, and 16 BSWPD, 37°, Virgil lime (Penn) 3,540-88 ft. TD 3,650 ft. New oil discovery.

WEST CENTRAL TEXAS

Brown County: W. H. Black 1 W. L. Blair, Subd. 17, Jeff Dickinson Sur. 10, 2 miles north of May. IP 45 BOPD, ½-in. choke, 40°, GOR 278.1, TP 55 psi., Marble Falls 3,002-18 ft. TD 3,042 ft.

WEST TEXAS

Culberson County: Utex Exploration Co. 2 E. E. Pokorny, 28-60-T1, T&P Sur., 26 miles northwest of Orla. IPP 5 BOPD, 43°, GOR 387:1, pay 1,693-96 ft. TD 1,870 ft.

Ector County: W. R. Goddard et al 1 Jessie Mae Williamson, 18-45-T1N-T&P, 7 miles north of Notrees, 1¼ miles northwest of West Goldsmith field. Dual completion. IP 457½ BOPD, 20/64-in. choke, GOR 928, CP 350 psi. Devonian 8,002-52 ft.; IP 327 BOPD, 20/64-in. choke, 37°, GOR 1250:1, TP 800 psi., Wichita Albany 6,852-74, 6,900-50 ft. TD 10,085 ft., ground elev. 3,322 ft.

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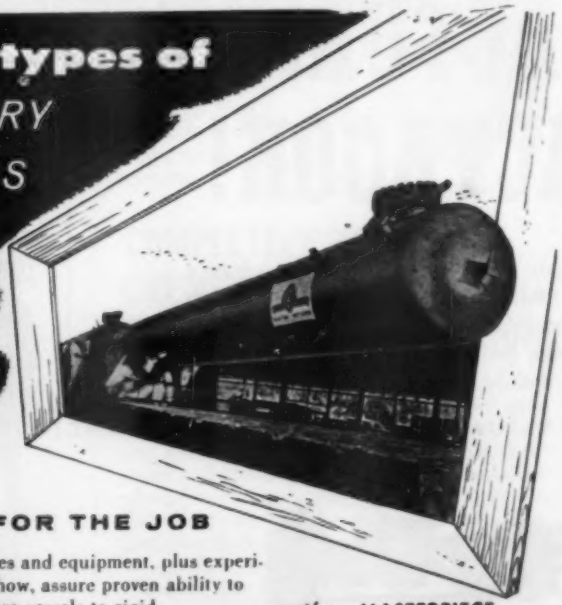

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PAUL L. LYONS, the new AGI president, bets that . . .

Geophysics Due a Comeback

. . . in domestic exploration. Sinclair oil-finder says geophysics will find strat traps, map obscure structures.

THERE'S still plenty of oil to be found in this country.

And the future for the domestic oil industry is still not pessimistic despite the current depressing effects of foreign production.

This cheerful view is that of Paul L. Lyons, chief geophysicist of Sinclair Oil & Gas Co., and newly elected president of the American Geological Institute.

As president of AGI, Lyons will direct the activities of an organization in Washington representing 14 affiliated earth-science societies. The AGI serves its member societies as a coordinator of cooperative efforts, as a public-relations center, and as a central contact with a host of federal and scientific agencies.

Happy union . . . Cooperation with competing scientific disciplines is nothing new for Lyons.

He is trained in both geology and geophysics and has relied on the store of knowledge represented by both sciences in his successful oil-finding career.

Lyons, like many of his colleagues in oil-hunting ranks, believes that the skills of the geologist and geophysicist must be combined in the future.

"The geologist went underground some time ago in his search for oil," Lyons says. "The geophysicist's future also lies in that direction.

"The geophysicist soon will use his science to find strat traps and map obscure structures. We have the instruments now to do that. The success will depend on more skillful interpretation of the data furnished by our instruments."

Lyons says geophysics is playing a big role in the present world-wide pickup in exploration. This earth science will come back strong in this country, too, he adds, when the economic climate for exploration improves.

"A tremendous gain in world petroleum demand would save us right now," he says, adding: "And I'm confident that eventually demand will pick up enough that the present world oversupply of oil will end and domestic exploration will become more attractive."

A top oil finder . . . Lyons has had his share of thrills that come from being in the thick of important oil discoveries.

Born in Oklahoma City 47 years ago, Lyons received his secondary education in Indianapolis schools and his bachelor's degree in geology from DePauw University. He since has completed work for his master's and doctor's degrees in geology and geophysics at the University of Tulsa.

Lyons got into the oil business in 1934 with Humble as a rodman. The next year he joined Carter as a geophysical interpreter at a time when geophysics was becoming "big league" as an oil-finding tool.

The young geophysicist spent 17 years with Carter becoming successively chief computer, technical supervisor, assistant to the vice president for exploration, and staff geologist.

During that time he was a part of Carter's fine exploration team which used geophysics so successfully in discovering such fields as Louden, Dix, and Mattoon fields in Illinois; Magnolia, McKamie, and Village pools in Arkansas; the Golden Trend of southern Oklahoma; Pickens field in Mississippi; and Ada field in North Louisiana.

Lyons joined Anchor Petroleum Co., Tulsa, in 1951 and helped this company set up an exploration and production department. In 4 years, Lyons' department discovered and developed West Polo and West Laurie fields in Oklahoma, among others.

Lyons joined Sinclair as chief geophysicist in 1955. Since then Lyons has seen geophysics play a major role in such Sinclair strikes at Madill, Southwest Enville, Alden, and Harper County, Oklahoma, and others offshore.

Lyons is a modest, genial, scholarly man and is the first to disclaim a major role for himself in all the oil discoveries in which he has participated. Rather, he is proud that geophysics—used deftly by experts who can read the data—is still proving that it's a superior oil-finding tool.

A society man . . . As one might expect from his superior exploration records, Lyons is a leader in activities of the scientific societies.

He served for 2 years as editor of Geophysics, technical journal of the Society of Exploration Geophysicists, and in 1954-55 was president of SEG. He will take over his new job as president of AGI after serving for a year as vice president.

You might also put Lyons down as a family man. He and his wife, the former Abbie Amrine, have five children—three girls and two boys ranging in ages from 6 to 17.

●

Jack D. Gray, staff geologist for Champlin Oil & Refining Co., has been named area geologist in the company's Denver office.

Grant Heatzig, recent graduate of Rensselaer Polytechnic Institute, Troy, N. Y., has joined Harry Wassall & Associates, consulting geologists, in Havana, Cuba, as a geologist.

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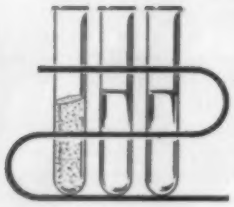

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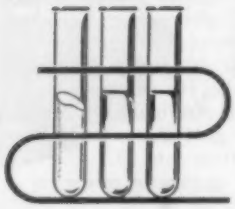

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▶▶▶ Personals

Robert H. Rowland has been named manager of the Hawaiian refinery of Standard Oil Co. of California, Western Operations, Inc. The refinery is now under construction near Honolulu. Rowland joined California Standard in 1938 after graduation from the University of Michigan. He was named superintendent of California Oil Co.'s Perth Amboy, N. J., refinery in 1947 and manager there in 1950. He moved to California Standard's headquarters in San Francisco earlier this year. The Hawaiian refinery is scheduled to go on stream in late 1960. Construction began in October.

James W. McCummings has resigned as vice president and general manager of Dearborn Oil & Gas Corp. and Holly Oil & Gas Corp. to become an independent operator in Evansville, Ind. He will continue as a consultant for Holly.

C. E. Kaddy, Jacob C. Muskin, and **E. Roy Sweet** have been named partners in Singmaster & Breyer, New York metallurgical and chemical process engineers. The company is an affiliate of Fluor Corp., Ltd. Kaddy is construction manager of the company, Muskin, chief structural engineer, and Sweet, manager of chemical engineering.

Thomas L. Wark, vice president and special assistant to the president of Tidewater Oil Co., has retired after 38 years with the company. Wark joined Tidewater in 1920 after graduation from Stanford University. He became vice president and head of the production department in 1946 and general manager of the western division in 1954. He had been special assistant to the president since earlier this year.

Dr. Myron Dmytryszyn, research chemical engineer in Monsanto Chemical Co.'s organic chemicals division, St. Louis, has been named group leader for engineering and economic evaluations and statistics in the division. Also in the St. Louis organic chemicals division, **John H. Van Ness** has been appointed group leader for research on maleic anhydride and phthalic anhydride. **Earl L. Will** becomes group leader in charge of the research engine laboratory, and **Lester H. Krone, Jr.,** has joined Monsanto's applied mathematics section, research and engineering division, in St. Louis.

G. F. Phillips, district superintendent for Arkansas Fuel Oil Corp., has been transferred to Olla, La., from Tullos, La. The move results from consolidation of the Olla and Tullos districts.

J. J. Rasor, Tulsa division manager for Wanda Petroleum Co., has been elected a vice president. Rasor became Tulsa division manager last January.

Truett Helms, Jr., land man in Dallas for Southern Union Gas Co., has been named manager of the land department there. He succeeds the late Howard McDade.

Chester C. Lindsey, field man for United Natural Gas Co. in Pennsylvania's Ridgway field, and **Emil T. Johnson,** Clermont, Pa., field man, have retired.

J. J. Augusteign has been appointed general manager of the western division of Cia. Shell de Venezuela. He replaces **John Warder,** vice president, who has been transferred to Caracas.

Joseph L. Russell, formerly with Dow Chemical Co.'s polychemicals research department, has been named director of engineering research for Scientific Design Co., Inc. Russell is a graduate of the University of Kansas and Massachusetts Institute of Technology.

William J. Krepps, Oklahoma City district geologist for Tennessee Gas Transmission Co., has been promoted to district exploration manager in Wichita. He succeeds the late D. B. Wines. **E. S. Rouget,** senior geologist in Oklahoma City district, will succeed Krepps as district geologist there.

G. J. F. Breedveld, manager of planning and organization methods in Cia. Shell de Venezuela's western division, has been promoted to general manager of the refining division at Cardon, Venezuela. He succeeds **W. F. C. Mackie,** who has retired. Breedveld has been with Royal Dutch-Shell companies since 1932.

R. P. Smith, assistant district superintendent in Tyler, Tex., for Sun Oil Co., has been elected chairman of the East Texas chapter of American Petroleum Institute's Division of Production. He succeeds **A. Earl White,** general manager of Mustang Drilling Corp., Tyler. Other officers are **James Foster,** vice chairman; **Leo K. Walker,** secretary-treasurer; and **W. G. Searcy,** assistant secretary-treasurer. All three are from Kilgore, Tex.

G. W. Marshmeyer, eastern division production superintendent for Socony Mobil Oil de Venezuela, has retired after 31 years with the company.

Keith E. Lorentzen and **Emil M. Banas** have been appointed project chemists at the Whiting, Ind., research laboratories of Standard Oil Co. (Ind.). **Walter W. Frank** has been named an automotive engineer there.

G. W. Robison, Ohio Oil Co., has been elected president of Four Corners Landmen's Association. Other officers include **Jim Vandiver,** El Paso Natural Gas Products Co., first vice president; **Zach Jones,** Delhi-Taylor Oil Corp., second vice president; **Bryan Burk,** Atlantic Refining Co., secretary; and **C. V. Healy,** Amerada Petroleum Corp., treasurer.

STAUDT

John Staudt, executive vice president and a director of Dowell division of Dow Chemical Co., has been named president of the newly organized Dowell division of Dow Chemical International, Ltd., S.A. Other officers are **A. C. Polk** and **L. B. Swan,** vice presidents; **Tromer R. Smith,** general manager; **Neil Miller,** treasurer; and **J. H. Hanes,** secretary. These officers and **A. P. Beutel** and **Oliver E. Beutel** are directors of the new division. Staudt, Polk, Miller, and Hanes will headquarter in Tulsa. Swan and Smith are in the new Dowell foreign headquarters in Houston. A. P. Beutel, president of Dowell and general manager of its Texas division, has headquarters in Freeport, Tex. He is also a director of Dow Chemical. O. E. Beutel is located in Midland, Mich., headquarters of the parent company.

George V. Rowland, manager of the rate and sales division of Cities Service Gas Co., and **H. O. Porter,** superintendent of the compressor department, have been elected directors. Four Cities Service Gas executives have been elected to the board of Cities Service Gas Producing Co., a subsidiary. They are **Clint D. Rogers,** vice president in charge of transmission; **H. H. Swigert,** treasurer; **John L. Gere,** vice president in charge of engineering; and **E. W. Lamparter,** assistant treasurer. Rogers, Swigert, and Gere are also directors of Cities Service Gas.

▶ ▶ ▶ Personals

YINGER

W. R. Yinger, manager of the southwestern division of King-Stevenson Oil Co. in Oklahoma City, has been named general exploration manager of the company. **Jack E. Trigg,** formerly vice president of Trigg Drilling Co., has been named manager of King-Stevenson's Rocky Mountain-Williston basin division. He will headquarter in a new Denver office. **J. Keith Miller,** formerly with Pan American Petroleum Corp., has joined the company as manager of the land department. The changes are initial steps in an expansion program planned by King-Stevenson. The company has production in Montana, North Dakota, Illinois, Oklahoma, Kansas, and Texas.

A. S. Marken, area petroleum engineer in Great Bend, Kans., for The Texas Co., has been transferred to Wichita as reservoir engineer.

Alfred A. Long, assistant manager of production for Ohio Fuel Gas Co., has retired. Long joined Ohio Fuel in 1913. He was superintendent of the lease department before becoming assistant manager of production in 1951.

Ronald T. Dickson, formerly with British American Oil Co., Ltd., in Calgary, has joined the petroleum engineering department of Monsanto Chemical Co.'s Lion Oil Co. division. He will headquarter in the company's Calgary district office. **Dr. Lionel T. Wolford,** recent graduate of Tulane University, has joined the research department of Lion Oil in El Dorado, Ark.

Fred J. Shipley, Texas Railroad Commission, has been reelected president of the Oil Men's Club of Houston. Also reelected were **Paul Hayes,** independent operator, vice president; and **Fred Ashford, Jr.,** Texas Pipe Line Co., secretary-treasurer. Named to the club's board of directors were **James L. Womack,** Scurlock Oil Co., chairman; **L. M. Bean,** Texas Pipe Line Co.; **D. W. Flyge,** Gulf Oil Corp.; **D. R. Harris,** Crown Central Petroleum Corp.; **Howard Montgomery,** Warren Petroleum Corp.; **W. L. Seibert,** Pure Oil Co.; and **E. V. Shannon,** Dillard-Waltermire, Inc.

F. R. Sutphin, lease foreman with Shell Oil Co., has been transferred to McLeansboro, Ill., from Brownstown, Ill.

W. L. Ware, district superintendent for Seaboard Oil Co. in Powell, Wyo., has been transferred to Chinook, Mont., as production foreman for The Texas Co.

J. W. Alliston and **T. M. Newsom** have been named senior supervising engineers in the technical division at Humble Oil & Refining Co.'s Baytown, Tex., refinery. Alliston will supervise the solvents section, Newsom the petrochemicals section. **S. H. Coleman** has been promoted to staff engineer in the technical division at Baytown.

C. R. Elder, Jr., general superintendent of Sohio Pipe Line Co., has been elected vice president and a director of the company. Elder joined Sohio in 1947 as an engineer. He was assistant superintendent and superintendent of the southwestern division and superintendent of the Tri-State division before becoming general superintendent.

Irving E. Chapman, executive assistant to Tidewater Oil Co.'s western general manager, has been named executive assistant to **John E. Roth,** senior vice president and director. **Robert C. Hadden,** supervisor of the western division's oil purchase and exchange department, has been promoted to executive assistant to **Charles R. Brown,** western division vice president and general manager. **Walter I. Weed, Jr.,** assistant supervisor of the oil purchase and exchange department, moves up to supervisor.

Charles T. Easley, district exploration supervisor in Lafayette, La., for Delhi-Taylor Oil Corp., has been named resident manager of Delhi Australian Petroleum, Ltd., a subsidiary. Delhi Australian is carrying on a joint exploration program in Australia with Santos, Ltd. **John C. Ryan** will continue as exploration supervisor for Delhi Australian. **Horace G. Pullin,** drilling superintendent, has been assigned to the Australian company. Also, **A. R. Gibson,** petroleum engineer in Alice, Tex., has been named petroleum engineer with Delhi Australian. Easley will be responsible for administrative, exploration, and drilling operations of Delhi Australian and will act as liaison between the company and its Australian associates. A graduate of Louisiana State University, Easley joined Delhi-Taylor in 1955.

K. L. Brown, assistant production superintendent for Magnolia Petroleum Co. in Healdton, Okla., has been named district production superintendent in Salem, Ill. He succeeds **Harvey Lee,** who has retired after 41 years with Magnolia.

Ben Piepgrass, district manager for Midstates Oil Corp. in Shreveport, La., has joined George Parker & Sons, San Antonio, Tex. Piepgrass was district manager in San Antonio for Midstates before moving to Shreveport last year.

Jim P. Ryan, regional land man in Midland, Tex., for Kerr-McGee Oil Industries, Inc., has been transferred to Denver as Rocky Mountain division land man. **Curtis Reagan,** New Orleans land man, will succeed Kyan in Midland. **Glen Hughes** has been transferred from Oklahoma City to replace Reagan in New Orleans.

Socony Mobil Oil Co., Inc., has appointed 10 district sales managers in a new step toward reorganization of its marketing department. Reorganization plans were announced last summer. The new sales managers are **Francis J. Breen,** formerly division marketing assistant, Chicago, now sales manager, Queens district, New York City; **Robert J. Bruce,** formerly assistant district manager, Green Bay, Wis., now district manager there; **Tom R. Culley,** district marketing assistant, Pittsburgh, now manager, Pittsburgh; **Gerald J. Griffin,** formerly district marketing assistant, Manchester, N. H., now manager, Worcester, Mass., district. Also, **William B. Hopkins,** formerly general manager of Independent Oil Co., a Socony affiliate in Altoona, Pa., has been named manager of the southeastern district, Baltimore. **Richard A. Jensen,** sales supervisor in St. Paul, becomes Mankato, Minn., district manager; and **Morton F. Jones, Jr.,** Philadelphia division marketing assistant, has been named manager of the Rochester, N. Y., district. **John R. Moreland,** assistant district manager in Indianapolis, becomes manager of the Madison, Wis., district. **George W. Otis,** assistant manager in Detroit, becomes district manager there. **Thomas L. Watkins, Jr.,** district marketing assistant in Utica, N. Y., has been named New Haven, Conn., district manager. District sales offices have been discontinued at Elmira and Jamestown, N. Y.; Brockton and East Boston, Mass.; Skokie, Ill.; Valparaiso, Ind.; Wausau, Wis.; and Dearborn, Mich. District offices in the metropolitan New York City area have been cut from seven to five.

P. A. Taylor, chief petroleum engineer for Mobil Oil of Canada, has been named manager of production for the new Mobil interests in Gabon and the Middle Congo in West Africa. He will headquarter in Paris. Taylor was with Royal Dutch-Shell companies before joining Mobil in 1952. He became chief petroleum engineer for the company in Calgary in 1953.

R. E. Alling, drilling superintendent with Creole Petroleum Corp. in Tia Juana, Venezuela, has retired. Alling had been with Creole 31 years. He will move to Dewey, Okla.

Merrill J. Anderson, automotive and tractor engineer in Ethyl Corp.'s eastern region, New York, has been promoted to chief automotive engineer in the central region, Chicago.

W. C. Summy, general production superintendent of Sinclair Venezuelan Oil Co., and **R. J. Tansey,** assistant treasurer and manager of treasury affairs, have been elected vice presidents of the company.

B. D. Bohna & Co., Ltd., and Cerro Industrial, Ltd., have opened a joint office in Calgary for engineering, design and construction services. **R. Franklin Parker,** formerly with Petrol Structor, Ltd., Calgary, will be resident manager.

M. J. Naughton, formerly superintendent of Cia. Shell de Venezuela's Cardon, Venezuela, refinery, has been promoted to assistant general manager of the refining division. Naughton joined Shell in 1933. He was on assignment in Egypt before moving to Venezuela in 1951.

W. L. Burnham, division geologist at Anaco, Venezuela, for Socony Mobil Oil Co. de Venezuela, has been transferred to French Equatorial Africa. Socony recently obtained a participating interest in the area from Ste. des Petroles d'Afrique Equatoriale Francaise (SPAEF).

Wayne C. Davison will open offices in Fairbanks and Anchorage shortly after January 1 as a consulting geologist and land specialist. Davison, currently in Tulsa, has done consulting geology in the Rocky Mountain region since 1946 and prior to that was a consultant at Houston.

L. D. Rose has joined California Research Corp. as research engineer at the company's La Habra, Calif., laboratory.

Marvin L. Hayes, assistant to the corporate secretary of Standard Oil Co. (Ind.), has been named administrative assistant in the office of the chairman.

H. Richard Whittall, president of the Vancouver Stock Exchange and a director of Pacific Petroleums, Ltd., West Coast Transmission Co., and Kroy Oils, Ltd., and **Thomas H. McClelland,** vice president of Placer Development, Ltd., have been elected directors of International Mining Corp.

Kirby E. Crenshaw, president of Cities Service Gas Co., has been elected a director of Cities Service Co., the parent company. Crenshaw joined Cities Service in 1930. He was assistant manager of the natural-gas department of Cities Service Petroleum before becoming executive vice president of Cities Service Gas in 1956. He became president of the company in August.

Richard R. Newton, formerly with the petroleum department of First National City Bank of New York, has been named president and general manager of Ryder Scott Management Co. Other officers of the new corporation are **Donald T. May, John F. Buckwalter,** and **Gordon F. Sawdy,** partners in Ryder Scott Co. Petroleum Engineers, Wichita Falls, Tex., consulting firm. Newton will headquarter in Wichita Falls. Newton was with Smith Newton Oil Co. and Continental Oil Co. before joining First National City Bank.

▶▶▶ Personals

Harry Ptasynski, district geologist in Casper, Wyo., for Pure Oil Co., has resigned to open consulting offices there.

O. I. Jantz, seismic party chief for Amerada Petroleum Corp., has been transferred to Grand Isle, La., from Abbeville, La.

William H. Mahler, marine representative in Gulf Oil Corp.'s New York sales division, has been named supervisor, transportation market, in the division. Mahler has been with Gulf since 1945. He succeeds **E. T. Reilly,** who has been transferred to refinery sales.

Charles E. Anderson, purchasing development manager in the purchasing department of Standard Oil Co. (Ind.), has been named manager of the purchasing planning division. He succeeds **Lyle E. Schaffer,** who recently was appointed construction and equipment division purchasing agent.

Ellis K. Fields, group leader in the Whiting, Ind., research laboratories of Standard Oil Co. (Ind.), has been named research associate there. **Alan M. Dobry** has been appointed senior project chemist at Whiting. **Paul E. Schmidt** has been named group leader in chemicals research.

George D. Daly, Jr., formerly petroleum engineer in Atlantic Refining Co.'s Mid-Continent division production department, has joined **Herman H. Kaveler,** Tulsa petroleum engineering and management consultant, as petroleum engineer. Daly is a graduate of the University of Houston.

▶▶▶ Deaths

C. C. Brown, 52, district superintendent in Eunice, N. M., for Gulf Oil Corp., was killed November 21 when his light plane crashed at an Oklahoma City airport.

Charles F. (Boss Kett) Kettering, 82, retired head of the research division of General Motors Corp., inventor of the automobile self-starter and many other mechanical developments, died November 25 at his home in Dayton, Ohio. Kettering's inventions were not confined to the automotive field. They included baby incubators, aerial torpedoes, fever machines, refrigeration units, antiknock gasoline additives, diesel engines, and accounting machines. He held 140 patents. Kettering joined General Motors in 1919 when it absorbed Dayton Engineering Laboratories, Inc. (Delco), which he had helped form. He was active in the automotive field before this time, however. Work on the self-starter was done in 1911.

John Schickram, 62, accountant with Sinclair Oil Co. for 39 years, died November 20 in Tulsa after a heart attack.

Victor I. Melvin, 73, retired accountant with Warren Petroleum Corp., died November 22 in a Tulsa hospital. Melvin retired in 1956.

Crude production will increase

. . . but won't set new records this winter

BY JOHN C. CASPER

CRUDE production this month will be a near record for December, topped only by the abnormal runs in 1956. The expected production rate for December also will raise the total for the quarter enough to make it the second-highest fourth quarter on record. This seems to characterize the coming winter. It will be just below the best.

Production in December is expected to average near 7,200,000 bbl. daily. There have been only 8 months in the past with production averages above this total. The year 1956 accounted for three of the months, and the others were in the first half of 1957.

Crude production for most of 1958 has been held back by several depressing factors:

. . . Total demand has been running behind last year. August was the first month this year to show a gain over 1957. The average through October was about 2.4% behind the total for the same period last year. Domestic demand through August was up only 0.9% over 1957. Exports showed a loss of 59% because of increased shipments last year during shortage period caused by the Suez Canal closing.

. . . Part of this year's demand has been supplied from inventories in contrast with heavy stock gains in 1956 and 1957. During the first 8 months of this year, oil men reduced crude and product stocks 45,000,000 bbl. In the same period last year, stocks increased 55,000,000 bbl. Thus, the difference in stock changes represents a supply differential of 100,000,000 bbl.

. . . Imports have supplied a larger portion of demand this year than in 1957. For the first 8 months of this year, crude and products imports represented 17.9% of total demand. Last year, foreign oils supplied 16.5% of demand.

The major shift in imports this year has been the big gain in receipts of foreign-made products. For the January-August period, crude imports dropped 8.4% but product imports gained almost 30%. Receipts of finished and unfinished gasoline have been about six times the average for last year.

Stocks now have been reduced to near normal levels. There will be no need for extreme downward stock adjustments over the next few months. Warm weather has prevented the expected drawdown of distillate inventories, but these can be tailored to demand over the winter months.

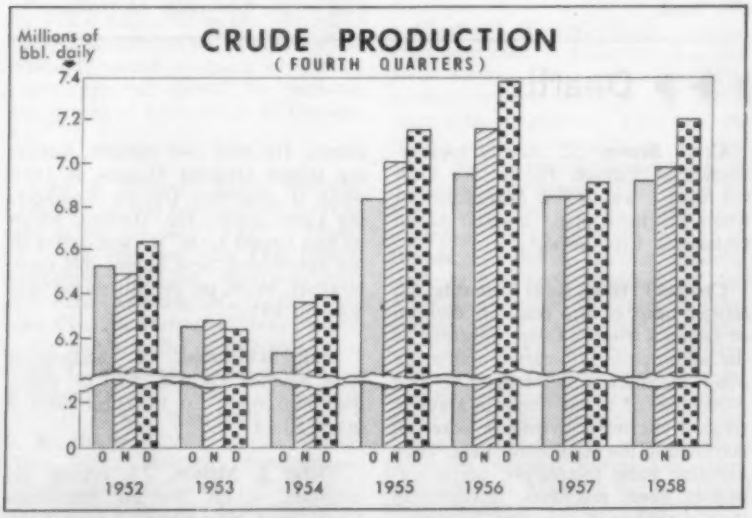
With the inventory-demand ratio near normal, crude production over the remainder of the winter will be determined by demand. If temperatures are near normal in the areas where distillate is the principal fuel for home heating, total demand will approach 10,400,000 bbl. daily for the first quarter of next year. This average would be about 225,000 bbl. daily less than the record set in the first quarter of 1957 during the Suez crisis.

Unless imports are reduced, this demand can be met by a crude production rate of about 7,300,000 bbl. daily. Production averaged 7,623,000 bbl. daily for the first quarter of 1957, but total exports were averaging over 960,000 bbl. daily compared with the 250,000 bbl. daily expected this winter.

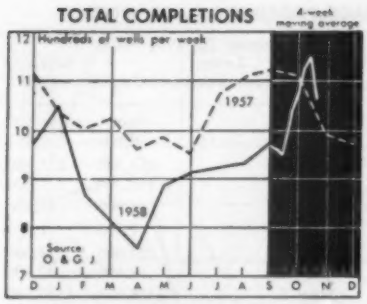
Thus, a normal winter will bring a good increase in crude production but probably will not produce a new record. Look for the new record in the first quarter of 1960.

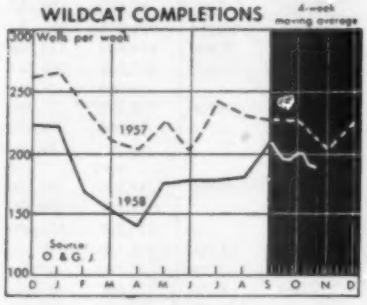
A quick look at the highlights . . .

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	6,993,550	UP	48,075	UP	157,600
Crude stocks	256,592,000	UP	1,718,000	DOWN	25,494,000
Completions	968	DOWN	152	DOWN	47
Refinery runs	7,880,000	UP	125,000	UP	181,000
Gasoline stocks	169,932,000	UP	623,000	DOWN	13,458,000
Kerosine stocks	32,155,000	DOWN	65,000	DOWN	787,000
Distillate stocks	162,415,000	DOWN	1,915,000	DOWN	7,462,000
Residual stocks	66,619,000	DOWN	632,000	UP	7,333,000
Four-product stocks	431,121,000	DOWN	1,989,000	DOWN	14,374,000
Total imports	1,733,000	DOWN	156,700	UP	121,100



DECEMBER is the peak crude-production month of the last quarter. The only exception in recent years was in 1953.





Active Rotary Rigs*

	11-24-58	11-17-58	11-25-57
Alabama	13	13	7
Arkansas	26	25	28
Arizona	1	2	1
California	88	88	99
Colorado	25	30	47
Florida	1	1	2
Georgia	....	....	....
Idaho	....	....	....
Illinois	58	51	37
Indiana	7	8	8
Iowa	3	3	2
Kansas	136	149	146
Kentucky	8	5	6
Louisiana	327	316	389
North	40	37	52
South	245	238	257
Offshore	42	41	80
Maryland	1	1	....
Michigan	13	12	10
Missouri	2	1	....
Montana	22	25	36
Mississippi	57	56	44
Nebraska	21	23	25
Nevada	....	....	....
New Mexico	107	108	149
New York	1	1	1
North Dakota	27	32	42
Ohio	5	5	1
Oklahoma	253	241	245
Oregon	....	....	....
Pennsylvania	10	9	9
South Dakota	....	....	2
Texas	804	787	888
South-Gulf	158	146	173
Offshore	1	1	5
North-East	174	168	(†)
West Central	293	297	(†)
West	178	175	(†)
Tennessee	....	....	....
Utah	41	43	55
Washington	1	1	1
West Virginia	3	4	4
Wyoming	77	75	67
Virginia	....	....	....
Total U. S.	**2,138**	2,115	2,351
Western Canada	165	161	166
Eastern Canada	3	3	2
Grand Total	2,306	2,279	2,519

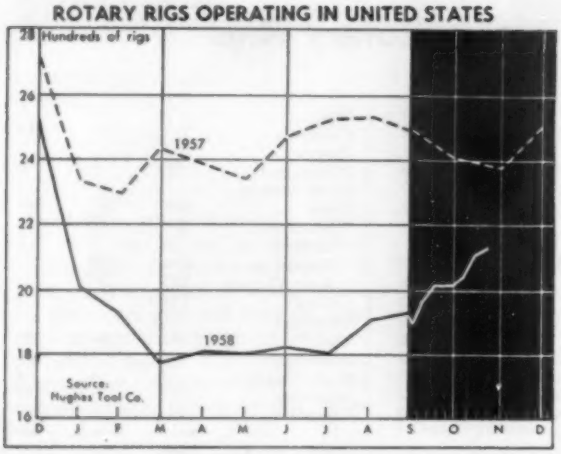
*Hughes Tool Co. †Comparisons not available due to change in method of reporting.

WEEKLY WELL COMPLETIONS . . . WEEK ENDED NOVEMBER 22, 1958

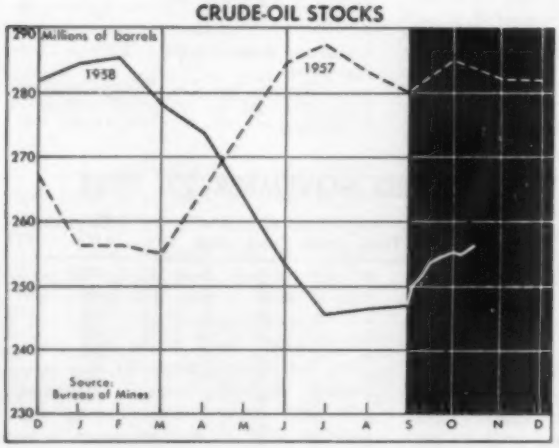
	Total wells							Cumulative		Total wildcats					Cumulative	
	Total	Crude	Cond.	Gas	Dry	Service	Footage	1958	1957	Total	Crude	Cond.	Gas	Dry	1958	1957
Alabama	0	0	0	0	0	0	0	69	72	0	0	0	0	0	26	25
Arkansas	15	6	0	0	9	0	42,077	720	1,005	3	0	0	0	3	146	186
California	22	12	0	2	8	0	107,286	1,353	2,001	8	1	0	0	7	332	473
Colorado	20	1	1	4	14	0	105,707	766	773	10	0	1	0	9	440	502
Illinois	77	23	0	2	37	15	180,561	2,106	2,434	8	0	0	1	7	406	577
Indiana	19	6	0	1	12	0	27,731	768	628	10	3	0	0	7	278	120
Kansas	92	42	0	2	44	4	312,201	3,593	3,795	21	0	0	0	21	747	734
Kentucky	56	40	0	1	15	0	60,203	1,667	1,370	6	0	0	0	6	159	281
Louisiana	68	28	6	6	28	0	490,820	3,100	3,499	9	0	0	0	9	457	614
North	33	13	0	4	16	0	132,553	1,216	1,310	7	0	0	0	7	202	182
South	32	13	6	1	12	0	332,632	1,505	1,574	2	0	0	0	2	231	353
Offshore	3	2	0	1	0	0	25,635	379	615	0	0	0	0	0	24	79
Michigan	5	5	0	0	0	0	12,113	389	398	1	1	0	0	0	131	141
Mississippi	7	5	0	0	2	0	61,483	354	350	2	0	0	0	2	158	179
Montana	3	0	0	0	3	0	19,677	290	380	3	0	0	0	3	117	148
Nebraska	18	5	0	0	13	0	108,427	658	805	12	3	0	0	9	313	439
New Mexico	43	21	0	15	7	0	191,833	1,758	1,937	6	1	0	0	5	239	244
West	24	7	0	15	2	0	88,911	870	824	1	0	0	0	1	94	94
East	19	14	0	0	5	0	102,922	888	1,113	5	1	0	0	4	145	150
New York	10	5	0	0	0	5	13,500	483	419	0	0	0	0	0	41	9
North Dakota	4	3	0	0	1	0	21,963	410	263	0	0	0	0	0	129	117
Ohio	18	6	0	5	5	2	45,705	917	1,014	0	0	0	0	0	17	16
Oklahoma	121	57	1	6	53	4	410,702	5,643	5,673	16	3	0	0	13	770	680
Pennsylvania	0	0	0	0	0	0	0	528	571	0	0	0	0	0	19	41
Texas	336	198	8	14	114	2	1,388,044	16,079	19,425	57	4	3	1	49	3,230	4,577
Dist. 1	8	3	0	1	4	0	33,952	884	1,111	0	0	0	0	0	339	384
Dist. 2	11	2	2	3	4	0	57,823	663	700	4	0	1	0	3	174	238
Dist. 3	23	6	1	1	15	0	165,035	1,145	1,496	4	0	0	0	4	262	413
Dist. 4	16	4	2	2	8	0	86,030	1,031	1,256	5	0	1	0	4	305	399
East	22	13	0	0	9	0	110,315	1,094	1,226	4	0	0	0	4	296	343
Dist. 7-B	51	24	0	0	27	0	126,772	2,220	2,657	13	1	0	0	12	596	895
West	108	89	1	1	16	1	520,207	4,596	5,503	14	3	0	1	10	631	780
Dist. 9	71	42	1	1	26	1	184,560	3,258	4,204	10	0	0	0	10	513	1,022
Dist. 10	26	15	1	5	5	0	103,350	1,188	1,272	3	0	1	0	2	114	103
Utah	6	5	0	0	1	0	33,949	354	227	0	0	0	0	0	76	114
West Virginia	15	0	0	10	5	0	40,836	684	627	1	0	0	1	0	16	30
Wyoming	12	3	0	3	6	0	75,567	673	783	8	0	0	2	6	228	270
Misc. (S. D.)	1	0	0	0	1	0	1,454	86	124	1	0	0	0	1	76	106
Total U. S.	**968**	471	16	71	378	32	3,751,839	43,448	48,573	**182**	16	4	5	157	8,551	10,623
Prev. week	1,120	566	25	110	357	62	3,967,739	.....	.....	173	14	0	6	153	.....	.....
Cum. 1958	43,448	21,397	995	3,288	16,584	1,184	176,261,815	.....	.....	8,551	823	140	235	7,353	.....	.....
Western Canada	50	34	0	5	11	0	257,887	2,211	2,709	8	0	0	1	7	586	773

PRODUCTION

ROTARY RIGS OPERATING IN UNITED STATES



CRUDE-OIL STOCKS



CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	11-15-58	11-8-58	11-16-57
Pennsylvania	2,824	2,774	3,125
Other Appalachian	1,674	1,739	1,866
Illinois, Indiana, Michigan	9,812	10,011	10,841
Nebraska and North Dakota	2,546	2,375	2,787
Kansas	10,393	10,359	10,600
Oklahoma	17,222	16,963	20,986
Arkansas	2,237	2,331	2,564
Louisiana	17,514	17,349	20,652
North	2,831	2,903	3,388
South	14,683	14,446	17,264
Mississippi, Alabama, Florida	2,366	2,468	2,560
New Mexico	8,578	7,343	9,479
Texas	109,583	110,047	125,350
East Texas	8,111	8,291	9,723
West Texas	53,054	53,068	55,113
Texas Gulf	19,824	19,962	25,911
Other Texas	28,594	28,726	34,603
Wyoming	13,524	13,594	13,638
Other Rocky Mountain	9,122	9,672	7,344
California	33,230	33,546	32,319
Foreign	†15,967	14,303	17,975
Total	**256,592**	254,874	282,086

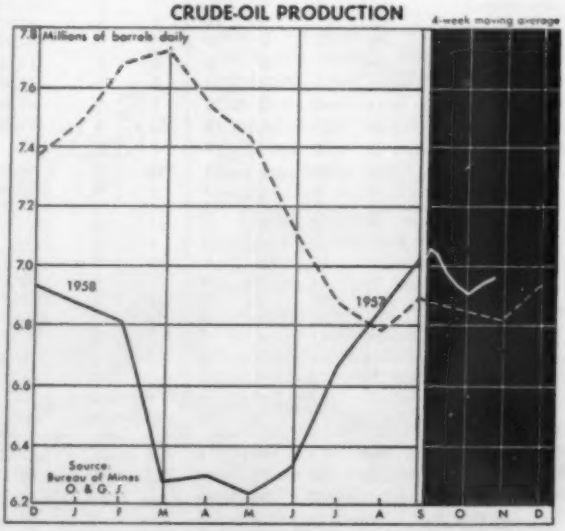
*Bureau of Mines. †Includes 5,486,000 bbl. in California.

DAILY AVERAGE PRODUCTION FOR WEEK

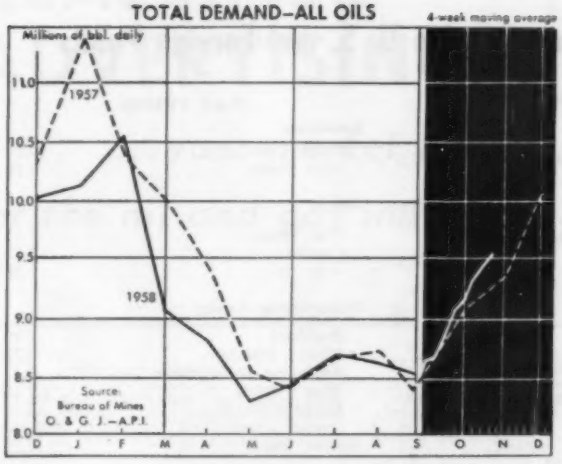
	November 22, 1958			Nov. 15
	Crude oil	Lease condensate	Total	total
Alabama	16,425		16,425	16,325
Arkansas	79,750	150	79,900	79,750
California	854,500		854,500	853,900
Colorado	132,300		132,300	132,000
Eastern	44,900		44,900	45,400
Florida	1,200		1,200	1,200
Illinois	227,000		227,000	218,000
Indiana	31,600		31,600	32,100
Kansas	†338,975		†338,975	†322,650
Kentucky	57,600		57,600	56,500
Louisiana	826,700	93,225	919,925	918,625
North	110,700	3,900	114,600	113,300
South	716,000	89,325	805,325	805,325
Michigan	25,700		25,700	25,600
Mississippi	115,750	4,700	120,450	120,450
Montana	78,900		78,900	77,000
Nebraska	59,100		59,100	59,000
Nevada	100		100	100
New Mexico	278,000	6,100	284,100	284,100
North Dakota	35,700		35,700	36,800
Oklahoma	†577,500		†577,500	†553,600
Texas	2,675,000	62,700	2,737,700	2,737,700
Dist. 1	47,000	700	47,700	47,700
Dist. 2	117,000	8,000	125,000	125,000
Dist. 3	361,000	31,000	392,000	392,000
Dist. 4	196,000	7,500	203,500	203,500
Dist. 5	30,000	400	30,400	30,400
Dist. 6	119,000	6,800	125,800	125,800
East Texas field	151,000		151,000	151,000
Dist. 7-B	138,000	75	138,075	138,075
Dist. 7-C	141,000	3,825	144,825	144,825
Dist. 8	1,067,000	2,000	1,069,000	1,069,000
Dist. 9	207,000	1,500	208,500	208,500
Dist. 10	101,000	900	101,900	101,900
Utah	36,000		36,000	40,000
Wyoming	333,800		333,800	334,500
Others	‡175		‡175	‡175
Total U. S.	6,826,675	166,875	**6,993,550**	6,945,475
Change from previous week, up			**48,075**	
Canada	†448,600		†448,600	†463,486
Total U. S. production, Jan. 1-Nov. 22			2,161,817,630 bbl.	
Same period last year (crude plus cond.)			*2,347,417,705 bbl.	

*Includes 45,742,115 bbl. condensate. †Week ended previous Monday. ‡South Dakota and Washington.

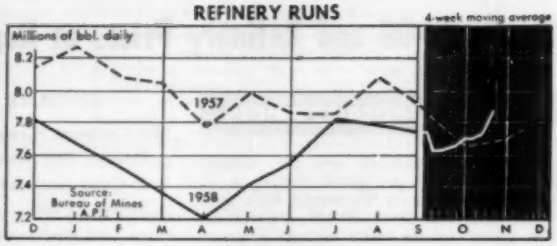
CRUDE-OIL PRODUCTION



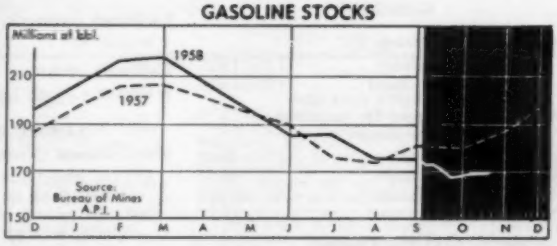
TOTAL DEMAND–ALL OILS



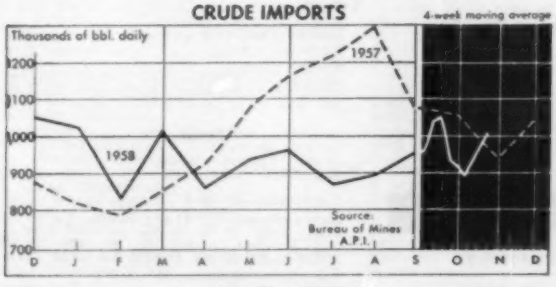
REFINERY RUNS



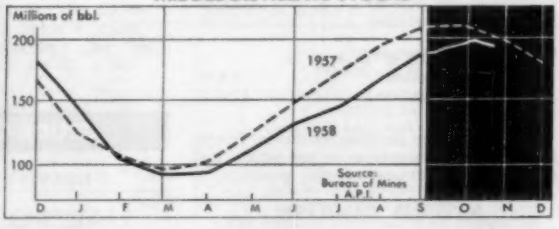
GASOLINE STOCKS



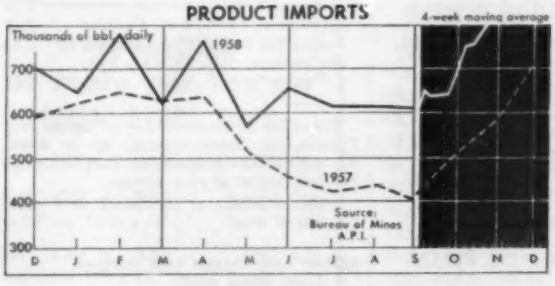
CRUDE IMPORTS



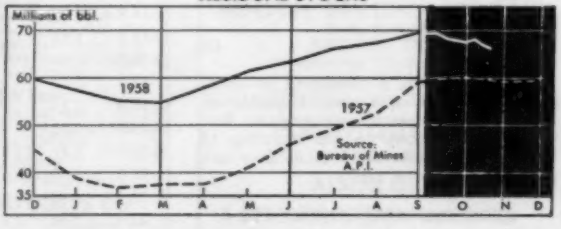
MIDDLE-DISTILLATE STOCKS



PRODUCT IMPORTS



RESIDUAL STOCKS



API REFINERY REPORT—NOVEMBER 21, 1958

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, November 1957 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,101	443.3	41.0	291.4	155.3	40,975	12,596	59,314	13,099	1,111	444.7	36.0	296.0	174.7
Appalachian:														
District 1	91	38.6	5.4	21.0	9.6	4,469	673	3,818	281	100	43.7	4.5	21.8	9.3
District 2	101	40.7	4.6	18.6	10.0	2,424	574	1,419	203	110	54.5	3.7	21.6	16.2
Ind., Ill., Ky.	1,441	761.4	61.6	330.7	150.4	29,473	8,002	30,588	5,475	1,441	762.6	73.4	306.5	185.5
Minn., Wis., Dak.	92	41.7	5.7	18.4	6.8	6,773	1,523	8,732	611	90	42.1	4.5	23.1	10.7
Okla., Kans., Mo.	701	361.9	8.6	185.0	14.3	15,340	1,691	12,841	1,066	693	393.1	13.2	170.6	37.2
Inland Texas	297	216.7	4.7	57.0	20.9	6,752	425	2,555	2,130	260	189.6	8.3	37.6	26.1
Tex. Gulf Coast	1,851	968.4	127.6	453.9	172.6	22,680	3,081	16,705	7,271	1,737	876.5	123.6	429.0	196.8
La. Gulf Coast	702	388.6	86.8	162.6	46.4	10,004	1,759	7,186	1,537	615	348.6	36.7	158.7	42.5
N. La. and Ark.	73	50.1	1.3	21.1	5.1	3,784	1,133	2,289	123	96	39.2	8.6	18.5	6.4
Rocky Mountain:														
New Mexico	23	15.7	.....	3.1	1.6	426	29	131	51	27	14.6	0.5	5.1	3.6
Other Rky. Mt.	270	123.7	0.8	59.9	33.7	4,378	292	2,944	994	275	133.8	4.2	67.7	36.8
West Coast	1,137	529.3	5.3	190.9	282.7	22,454	377	13,893	33,778	1,138	521.1	6.4	177.4	322.8
Nov. 21, 1958	7,880	3,980.1	353.4	1,813.6	909.4	169,932	32,155	162,415	66,619	7,693	3,864.1	323.6	1,733.6	1,068.6
Nov. 14, 1958	7,755	4,013.6	341.9	1,828.3	963.4	169,309	32,220	164,330	67,251	.....	.....	.....	.....	.....
Nov. 22, 1957	7,699	3,816.4	294.4	1,734.0	1,015.3	183,390	32,942	169,877	59,286	.....	.....	.....	.....	.....

*At refineries including natural blended. †Finished and unfinished ‡At refineries, bulk terminals, in transit, and in pipelines.

Crude-Oil and Refinery Prices at Representative U. S. and Foreign Points

REFINED-PRODUCT PRICES

Following quotations are for refinery products in cents per gallon moving in interstate shipments on Wednesday each week unless otherwise noted. Crude-oil prices are per barrel at the wells unless otherwise listed.

GASOLINE*

Mid-Continent (Group 3):	
Regular (89 octane)	11.50-11.625
Premium (99 octane)	14.50-14.625
Gulf Coast (cargoes for coastwise or export movements):	
Regular (90 octane)	10.25
Regular (92 octane)	10.50
Premium (97 octane)	11.625
Premium (98 octane)	11.75
California (rack) (Los Angeles):	
★ Regular (88 octane)	12.25
★ Premium (94 octane)	13.25
★ Premium (98 octane)	14.25
Caribbean area (cargoes):	
Regular (87 octane)	9.875
Premium (97 octane)	11.625

*Quotations are for octanes shown. Prices usually vary with octane ratings within the regular, premium, and aviation grades.

NATURAL GASOLINE*

Group 3:	
Grade 26-70	4.5
Breckenridge:	
Grade 26-70	4.0

*If 26-70 natural is considered as 100%, prices for lower-vapor-pressure grades increase 2.5% for each unit drop in Reid vapor pressure down to and including 16 lb. Prices for grades below 16 lb. may vary slightly by areas or plants.

KEROSINE AND DISTILLATE

Mid-Continent (Group 3):	
Kerosine 42-44	10.00
Diesel oil (58 d.i. and above)	9.75
Distillate No. 1	9.75
Distillate No. 2	9.00
Gulf Coast (cargoes):	
★ Kerosine 41-43	9.375
★ Distillate No. 2	8.875
New York Harbor (barges):	
★ Kerosine 41-43	10.20-10.70
★Distillate No. 2	9.70-10.20
★ Diesel fuel, 48-52 d.i.	10.30-10.70
Caribbean area (cargoes):	
★ Distillate No. 2	8.625-8.875

WAX (LB.)

Oklahoma (Group 3):	
132-135 A.m.p. (semi-refined) in tank car	6.50
New York (export):	
126-130 A.m.p. crude-scale (solid in bags or barrels)	7.35

★Denotes change from previous week.

RESIDUAL FUEL (BBL.)

Mid-Continent (Group 3):	
Residual fuel (max. 1% S)	$1.50
Gulf Coast (cargoes):	
Bunker C fuel	$2.00
New York Harbor (barges):	
Bunker C fuel	$2.37
Caribbean (cargoes):	
Bunker C	$2.00
California (rack):	
★ Bunker C fuel, Los Angeles	$2.15

LUBRICATING OILS

Mid-Continent (Group 3):	
150-160 bright stock, solvent refined, 0-10 pp., 95 v.i.	23.0
200 vis. neutral oil, solvent refined, 0-10 pp., 95 v.i.	20.5
Pennsylvania Grade:	
145-155 vis. at 210, bright stock, 8 color, 25 p.t.	22
200 vis. neutral (180° at 100°), 25 p.t.	21

CRUDE-OIL PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.	Okla-homa*	Gulf Coast Tex.†	West Tex.‡ N.M.	Wyo. (sour)
14-14.9	$1.86	....	....	....	....
15-15.9	1.95	....	....	....	$1.81
16-16.9	2.04	....	....	....	1.86
17-17.9	2.13	....	....	....	1.91
18-18.9	2.23	....	....	....	1.96
19-19.9	2.32	....	....	....	2.01
20-20.9	2.41	$2.52	....	$2.62	2.06
21-21.9	2.50	2.55	....	2.64	2.11
22-22.9	2.60	2.58	....	2.66	2.16
23-23.9	2.69	2.61	$3.44	2.68	2.21
24-24.9	2.78	2.64	3.46	2.70	2.26
25-25.9	2.87	2.67	3.48	2.72	2.31
26-26.9	2.96	2.70	3.50	2.74	2.36
27-27.9	3.06	2.73	3.52	2.76	2.49
28-28.9	3.11	2.76	3.54	2.78	2.54
29-29.9	3.16	2.79	3.56	2.80	2.59
30-30.9	3.22	2.82	....	2.82	2.63
31-31.9	3.27	2.85	....	2.84	2.67
32-32.9	3.33	2.88	....	2.86	2.71
33-33.9	3.38	2.91	....	2.88	2.75
34-34.9	3.44	2.94	....	2.90	2.79
35-35.9	3.49	2.97	....	2.92	2.83
36-36.9	3.55	3.00	....	2.94	2.87
37-37.9	3.60	3.02	....	2.96	2.89
38-38.9	....	3.04	....	2.98	2.91
39-39.9	....	3.06	....	3.00	2.93
40-44.9	....	3.08	....	3.02	2.95

*Top prices on other Oklahoma (sweet) postings vary from $3.15 to $3.01 a barrel. †Low cold test crude. ‡Sour.

Effective dates of broad changes: California, 9-30-58: East of California, January 3-10, 1957; Pennsylvania Grade, 6-18-58.

FLAT PRICES

Louisiana:	
Sweet Lake	$3.00
Ville Platte	3.30
Texas:	
East Texas	3.25
Conroe	3.53
Van	3.08
Pennsylvania Grade:	
Bradford	3.90
Middle District	3.72
Southwest Pennsylvania	3.43
West Virginia	3.25
Buckeye Grade	3.25
Illinois Basin	3.00
Canada:	
Leduc-Woodbend	2.67
Redwater (Alta.)	2.56
Smiley (Sask.)	2.33
Pembina	2.52

FOREIGN

Venezuela:	
Cumarebo, 48°-49.9°, Tucupido	3.66
San Joaquin, 41°-41.9°, Puerto La Cruz	3.25
Oficina, 35°-35.9°, Puerto La Cruz	3.05
Tia Juana medium, 26°-26.9°, Amuay*	2.55
Quiriquire, 16.0°-16.4°, Caripito	2.15
Lagunillas heavy, flat, Las Piedras*	2.10
Bachequero, flat, 15°-16°, Las Piedras*	1.93

Prices for all crudes of 24° or lighter vary 2 cents per degree change, up or down. All crudes heavier than 24° vary 2.5 cents per half-degree gravity change.

*Also available at La Salina at 3 cents per barrel less.

Middle East, Persian Gulf (cargoes, f.o.b. lifting port):	
Arabian, 36.0°-36.9°, Ras Tanura	$2.12
Iranian, 34.0°-34.9°, Bandar Masur	2.04
Iranian, 34.0°-34.9°, Ababan	1.99
Iraq, 35.0°-35.9°, Fao	1.98
Kuwait, 31.0°-31.9°, Mina-al-Ahmadi	1.85
Qatar, 41.0°-41.9°, Umm Said	2.23
Middle East, E. Mediterranean:	
Arabian, 36.0°-36.9°, Sidon	2.49
Iraq, 36.0°-36.9°, Tripoli, Banias	2.49
Far East (cargoes, f.o.b. Lutong, Sarawak):	
Seria Light, 37°	2.75

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(Latest reported spot fixtures)

★ Carib.-U.K., clean (Scale—30%) (22s. 9d.)	$3.19
★ Carib.-U.S.N.H., dirty (ATRS —55%)	1.24
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★ P.G.-Italy, dirty (USMC—63%)	3.05

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PETROLEUM ENGINEER—presently supervisor with major, desires change. 10 years experience production and drilling engineering. Either full or part time employment in states. Foreign considered. Box K-963, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST—Over 6 years major oil companies Rocky Mountain area and South America. Wide experience well site and subsurface exploration. Resume upon request. Box K-966, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY ENGINEER—M.S. Degree. Fifteen years active experience in operations, engineering, management, in refining and natural gasoline. Desire responsible position with aggressive organization. Will consider sales. Box 31R 150, 4041 Marlton Ave., Los Angeles 8, Calif.

PETROLEUM ENGINEER. Five years experience primarily in equipment, corrosion, drilling, and workovers. Excellent relations with line supervisors. 30. Married. Will relocate. Box K-969, The Oil and Gas Journal, Tulsa, Oklahoma.

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LEGAL

SEALED BIDS will be received until 2:00 P. M., Mountain Standard Time, December 10, 1958 and opened at that time in the Office of the Superintendent, Blackfeet Indian Agency, Browning, Montana, for the leasing of 36,759.68 acres of Tribal land and 988.635 acres of allotted Indian land located in Townships 37 North, Range 15 West; 37 North, Range 14 West; 36 North, Range 15 West; 36 North, Range 14 West; 35 North, Range 15 West, 35 North, Range 14; 34 North, Range 14 West, Glacier County, Montana, for oil and gas leasing purposes. The details of the lease offering and how and where to file bids may be obtained by addressing the inquiry to the Superintendent of the Blackfeet Indian Agency, at Browning, Montana. Howard F. Johnson, Superintendent.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington, D. C. Notice is hereby given that approximately 48.5 acres of land comprising the Veterans Administration Center Reservation in Shreveport, Caddo Parish, Louisiana, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1:00 P. M., E.S.T., December 17, 1958, when bids will be opened. Details of the lease offering, how and where to submit bids, may be obtained from the Geological Survey's Oil and Gas Supervisor at 239 Federal Building, Tulsa, Oklahoma or the Conservation Division, General Services Administration Building, Washington 25, D. C., and from the Minerals Staff Office or the Eastern States Land Office, Interior Building, Washington 25, D. C., Edward Woozley, Director.

Additional Successful Wildcats

WESTERN CANADA

Alberta: Midwest-Peerless 7-14-22-17 Countess, LSD 7, 14-22-17w4. Basal Colorado gas discovery. TD 3,815 ft.

TEXAS GULF COAST

Brazos County: Thomas W. Clay 1 Schoeps, E. M. Millican Sur., ½ mile northwest of Millican. AOF 15,700 M.c.f.d., dry gas, shut-in TP 934 psi., perf. 2,261-66 ft., Sparta sand. TD 16,655 ft. New pay and extension on East Millican Dome. (This is workover well drilled in 1945 by Phillips Petroleum Co. as 3 Schoeps.)

Colorado County: Cities Service Oil Co. 2-B Stephens, P. K. Bartlesson Sur., A-84, 5 miles northwest of Eagle Lake. IP 550 M.c.f.d., 36-in., TP 470 psi., perf. 10,734-43 ft., lower Wilcox sand, and 365 M.c.f.d., 36-in., TP 470 psi., perf. 10,480-86 ft., upper Wilcox sand. TD 12,415 ft. New pays in Ramsey field.

Starr Oil & Gas Co. 1 Hoyo, CTRR Co. Sur. 1, A-153, 1 mile northwest of Eagle Lake. AOF 13 M.M.c.f.d., GLR 41.24 M.c.f. per bbl., 52.2°, shut-in TP 3,407 psi., perf. 9,550-74 ft., Wilcox A-3 sand. TD 9,675 ft. New field.

Hardin County: Texas Gas Exploration Corp. 1 Nona Fletcher, T. P. Kuykendall Sur., A-356, 5 miles west of Kountze and 1¾ miles southwest of Nona Mills field. AOF 1,660 M.c.f.d., shut-in TP 3,240 psi., perf. 8,638-58 ft., and 18 M.M.c.f.d., shut-in. TP 2,806 psi., perf. 8,472-92 ft. TD 8,910 ft. New field—West Nona Mills.

Harris County: Eicher & Lively et al. 1 Malone, Reels & Troubough Sur., 1 mile east of Houston city limits. IP 123 BOPD, 16-in., 32°, GOR 220 cu. ft. per bbl., TP 535 psi., perf. 5,831-37 ft., Frio; AOF 53 M.M.c.f.d., GLR 125 M.c.f. per bbl., 38.2°, shut-in. TP 2,133 psi., perf. 5,733-39 ft., Frio; AOF 4,400 M.c.f.d., dry gas, shut-in. CP 1,607 psi., perf. 4,902-09½ ft., Frio. TD 8,078 ft. New pays in Clinton field.

Jefferson County: Carl Johnstone, Jr., 2-B Weed, T&NO Sur. 25, A-143, 3 miles northeast of Fannett and 1 mile southeast of Weed field, AOF 9,300 M.c.f.d. GLR 50 M.c.f. per bbl., 58°, shut-in TP 1,956 psi., perfs. 8,155-56 ft., Hackberry sand. TD 8,300 ft. New field.

Central Southern Oil Corp. 1 Broussard Trust et al., J. J. F. Gilleland Sur., A-453, 8 miles east of Fannett and 1½ miles southeast of Lovell Lake field. AOF 74 M.M.c.f.d., GLR 12.93 M.c.f. per bbl., 47.6°, shut-in TP 2,529 psi., perfs. 7,760-62 ft., Marginulina sand. TD 8,565 ft. New field.

Nueces County: Arnold O. Morgan 5 Wright. Sec. 17, George H. Paul Subd., Driscoll Ranch, ¼ mile south of Robstown. IP 84 BOPD, 16-in., 37°, GOR 7,500 cu. ft. per bbl., TP 1,625 psi., perf. 7,152-58 ft., Frio. TD 7,211 ft. New pay in South Robstown field.

Victoria County: Rodney Delange et al. 3 McCan et al., Sec. 33, IRR Sur., A-218, 12 miles northwest of Victoria. AOF 16 M.M.c.f.d., dry gas, shut-in TP 1,391 psi., perf. 3,233-36 ft., Frio. TD 6,225 ft. New pay and extension in Salem-Tolson gas area.

Live Oak County: Arnold Well Service Co. 2 Sanger estate, Section 351, TTRR Sur., 18 miles southwest of George West. AOF 4,700 M.c.f.d., dry gas, shut-in TP 735 psi., perf. 1,740-43 ft. TD 2,919 ft. New pay in South Texas field.

NORTH TEXAS

Cooke County: Anderson Petroleum Co. 1 J. F. Bugg, J. Demarcus Sur., A-314, 3 miles northwest of Woodbine, ½ mile northwest of Regular field, and offset to 3,369-ft. dry hole. IPP 85 BOPD, 43°, pay 2,420-25 ft. TD 2,425 ft.

Wise County: Johntom Oil Co., Inc., 1 Cleo Rann, David Moses Sur., A-537, 1 mile southwest of Decatur. Dual gas discovery. IP 1,400 M.c.f. gas, GOR 69,000:1, Caddo conglomerate 5,030-46 ft.; IP 6,300 M.c.f. gas, GOR 134,000:1, Atoka conglomerate 5,781-97 ft. TD 6,415 ft., elev. 897 ft.

Young County: M & W Oil Operators 1 Joe Grimes, J. Shelton Sur., A-249, 9 miles southwest of Graham, 1 mile northwest of Mississippian production, north offset to 4,686-ft. dry hole. IP 126 BOPD, 14/64-in. choke, 41°, GOR 750:1, TP 720 psi., Bend sand 4,136-48 ft. TD 4,249 ft., ground elev. 1,082 ft.

SOUTHWEST TEXAS

Duval County: Harkins & Co. et al. 1 Murphy estate, Section 112, BS&F Sur., A-1591, 17 miles northeast of Freer. AOF 12,000 M.c.f.d., GLR 50.1 M.c.f. per bbl., 60°, shut-in TP 3,328 psi., perf. 8,339-42 ft., Wilcox-Slick sand. TD 8,517 ft. Discovery well of Murphy field.

Hidalgo County: Clark Fuel Producing Co. et al. 1 Sheldon-Wood unit, Tract 253, Porcion 40, ½ mile southeast of

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BOX 1260 • TULSA 1, OKLA.

Sullivan City. AOF 560 M.c.f.d. dry gas, shut-in. TP 375 psi., perf. 2,181-85 ft., Frio. TD 3,515 ft. New pay In Sam Fordyce field.

Jim Wells County: Miller & Fox 1 Palacios, Share 1, San Diego de Arriba Grant, 8½ miles north of San Diego. AOF 9 M.M.c.f.d. GLR 334 M.c.f. per bbl., shut-in TP 1,375 psi., perf. 3,689-97 ft. (Frio), and 6,500 M.c.f.d., GLR 275 M.c.f. per bbl.., shut-in. TP 1,565 psi., perf. 4,071-83 ft., Jackson-Cole sand. TD 5,718 ft. New pay in unnamed new field.

TEXAS GULF COAST

Jefferson County: Meredith & Co. et al. 1 Doornbos et al., T&NO Sur., A-224, Lot 1, Block 9, Range "J," Port Arthur Land Co., 3 miles north of Port Arthur and 1 mile east of Port Acres field. AOF 10,500 M.c.f.d., 31.6 BC per M.M.c.f., shut-in TP 7,720 psi., perf. 12,060-70 ft. TD 12,290 ft. New pay extension Port Acres field.

Kleberg County: Katz Oil Co. 1 Woelfel, Section 35, Block 1, Kleberg Town & Improvement Subd., 3½ miles southeast of Kingsville. AOF 3,500 M.c.f.d., GLR 35.7 M.c.f. per bbl., 59°, shut-in TP 1,564 psi., perf. 8,520-28 ft., Frio. TD 8,546 ft. New pay in North Ricardo.

WEST CENTRAL TEXAS

Coleman County: Bridwell Oil Co. 1-O Mary Dunham, 98-2-GH&H, 5 miles north of Novice. IP 62 BOPD, 10/64-in. choke, 48°, GOR 420:1, TP 210 psi., Gardner sand 3,673-86 ft. TD 3,804 ft., elev. 1,947 ft.

Jones County: George Hamilton Fewell 1 R. E. Prichard, G. Martinez Sur. 195, 3 miles north of Hawley. IPP 26.2 BOPD, 37°, Tannehill 2,080-90 ft. TD 2,597 ft.

Taylor County: Jocelyn-Varn Oil Co. 1 Mary C. Bewley, M. P. King Sur., 3 miles south of Lawn. IP 1,011 M.c.f. gas, plus 7 BDPD, 60°, FP 640 psi., shut-in pressure 1,065 psi., Strawn 4,037-41 ft. TD 4,089 ft. Elev. 1,927 ft.

Taylor County: TXL Oil Corp. 1 Eugene G. Crayton, 35 miles southwest of Abilene, W. S. Henry Sur. 461, Lot 17. IP 126 BO 17 hours and 7 BW, 16/64-in. choke, 44.7°, GOR 570:1, upper Fry sand 5,329-43 ft. TD 5,736 ft. New oil discovery 2 miles north of Jocelyn Varn Fry area.

WEST TEXAS

Hockley County: Ohio Oil Co. 1 H. L. Moreland, Labor 22, League 26, Warton CSL Sur., 5 miles southeast of Levelland. IPP 187 BOPD, 30°, GOR 171:1, Wolfcamp 8,505-45 ft. TD 8,693 ft.

Pecos County: Frontier Drilling & Production Co. 1 Frank A. Perry, 16-C4-GC&SF, 5 miles south of Bakersfield. IPP 122 BOPD, 31°, GOR 200, Queen sand 2,282-2,314 ft., TD 2,352 ft.

Hunt Oil Co. 52 Elsinore Royalty Co., 21-D-GCSF, 15 miles southeast of Belding, 17 miles west of Puckett field. IP 4,100 M.c.f. gas, Devonian 11,432-72 ft. TD 15,099 ft.

Scurry County: Beck Oil Co. 1 Benard Glestine et ux, 2 miles northwest of Hermleigh, 151-3-H&TC. IP 57 BOPD, 13/64-in. choke, plus 8% water, 42°, Pennsylvanian 7,025-35 ft. TD 7,100 ft. New oil discovery.

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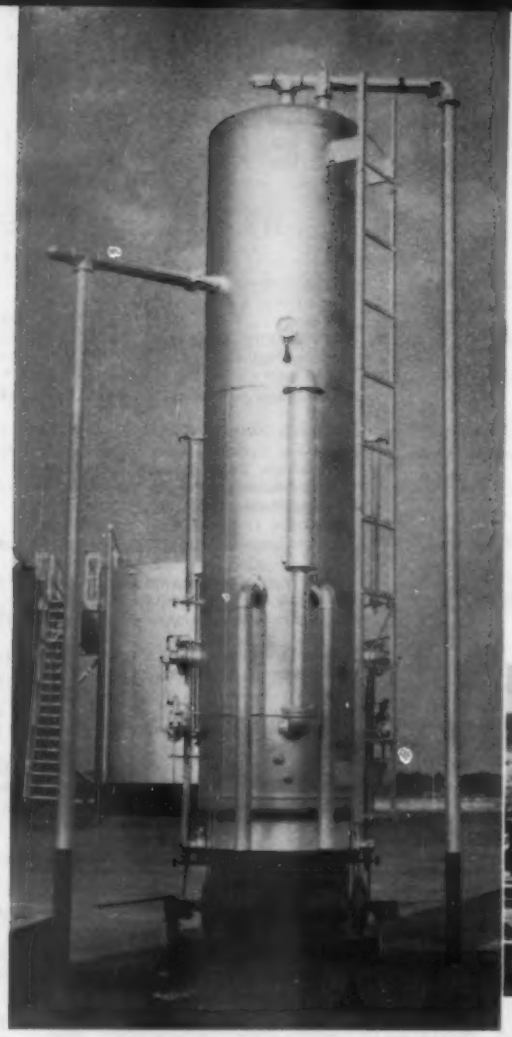
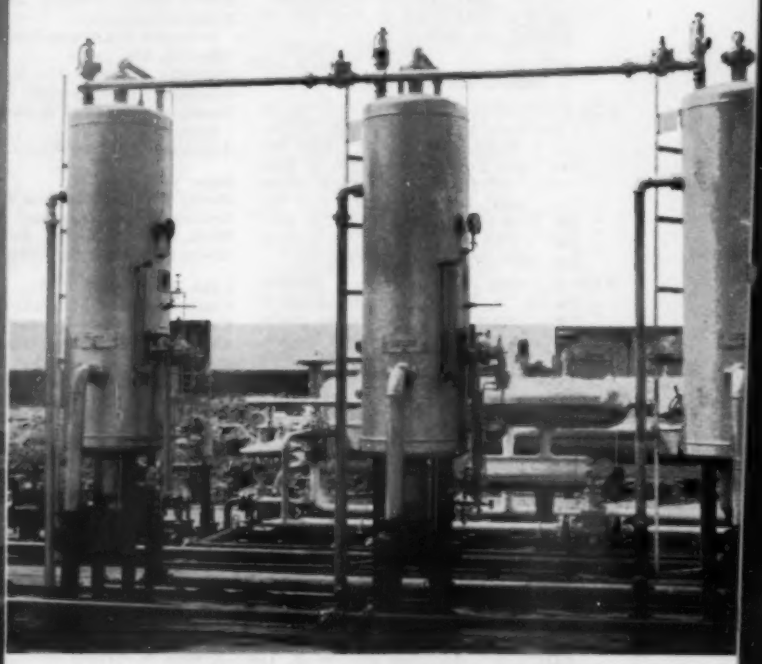


National Three - Phase (Oil - Gas - Water) Metering Separator in West Texas separating and measuring oil and water for individual well testing.



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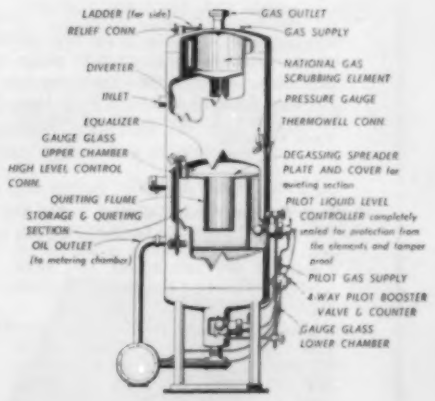

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